JULY 5, 1954

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

Hula ...and Highlines

IN HAWAII even the native dance gets a boost from an electrical circuit. For the story of power in the Islands, turn to page 30

ALSO IN THIS ISSUE

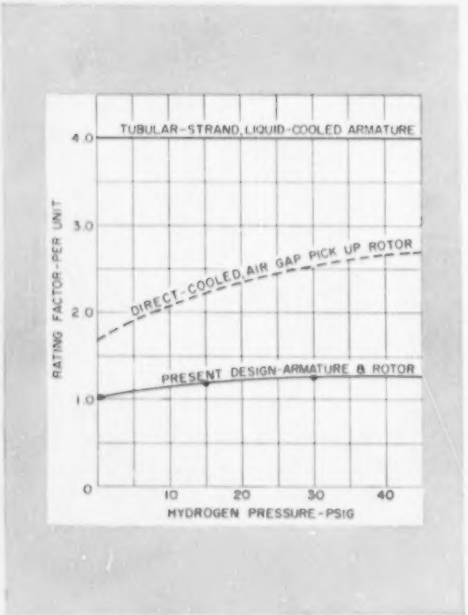
New Horizons for Engineers

TVA Installing Largest Pump-Turbine

Increased capacity in same frame size with new gas and liquid direct cooling is pointed out by H. D. Taylor, Mgr.—Generator Engineering (left) in discussion with R. S. Neblett, Mgr.—Marketing and C. Schabtach, Mgr.—Engineering, all of G.E.'s Large Steam Turbine-Generator Dept. Model of Eastlake Generator (left) rated 260,000 kva occupies same foundation area as conventionally cooled machine (right) rated 160,000 kva.

New cooling advance doubles generator capacity

Eastlake Station unit points way to increased ratings through direct cooling



Higher capacity possible with new G-E direct cooling developments are illustrated in these typical rating factors (1.0 equals 100% rating) for various types of armature and field cooling. These are based on thermal limits for 3600-rpm machines.

Generators of 350,000 to 400,000 kva capacity—and even larger—have become practicable through General Electric's contributions to progress in generator design. New turbine-generators will be able to deliver up to twice present output without appreciable increase in physical size.

DIRECT COOLING ADVANCES

General Electric's combination direct cooling—using gas for the rotor and liquid for the stator—makes possible greatly advanced turbine-generators. Two units employing this new cooling technique are now under construction for delivery in 1955; one rated 260,000 kva, 3600-rpm with 8340 amperes armature current, for Cleveland Electric Illuminating Company's Eastlake Station, and a similar unit for a large eastern utility.

In addition to being the only company offering this unique cooling technique, G.E. supplies conventionally cooled units up to 224,000 kva. Thus G.E. is able to furnish a turbine-generator employing either direct or conventional cooling to best suit conditions. In this way the electric utility companies obtain generating equipment of the most economical and efficient type for every set of requirements.

NEED FOR MORE POWER

Expansion of utility loads has created the economic need for larger blocks of power. Through advances, such as G.E.'s combination direct cooling, the utility industry can now obtain these larger blocks of power with economically and conservatively designed generators.

For information about the newest and most effective cooling techniques for turbine-generators write for GER-740A, "Progress in the Design and Application of Large Steam Turbine-driven Generators" to General Electric Company, Section 301-252, Schenectady 5, N. Y.

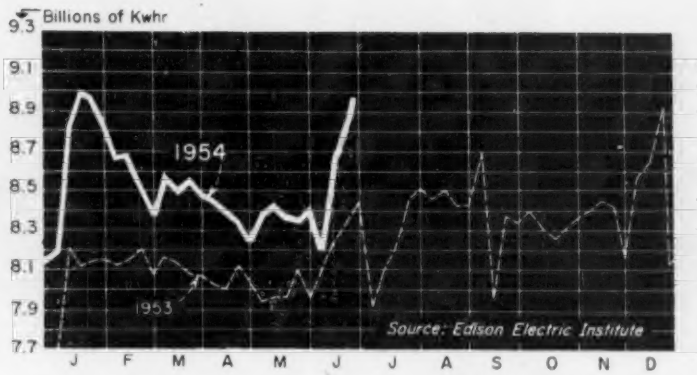
MORE POWER TO AMERICA

GENERAL ELECTRIC

Electrical World

July 5, 1954 Vol. 142, No. 1

Published for 80 years for those engaged in the business of generating, transmitting, distributing, or applying electric power



Output Week Ended June 26—8,981,000,000 Kwhr

Seasonally Adjusted Index†—177.3

Per Cent Changes From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
June 26	+6.3	+1.8	−0.3	−0.3	+12.6	+19.9	+5.9	+7.8	+3.9	+8.6
June 19	+6.3	+0.5	+1.0	+0.9	+7.5	+18.5	+2.9	+7.3	+9.6	+8.0
June 12	+5.0	+0.6	−0.8	−1.9	+5.0	+17.1	+1.1	+9.7	+9.4	+11.1

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load ‡(Million Kw)	Apr.	73.7	74.7	70.2
Capacity (Million Kw)	May	93.81	93.56	84.34
Production (Billion Kwhr)	Apr.	36.84	38.92	35.63
Hydro	Apr.	9.91	9.92	9.70
Fuel	Apr.	26.93	29.00	25.92
Fuel Consumption				
Coal (Million Tons)	Apr.	8.68	9.89	8.91
Oil (Million Barrels)	Apr.	4.78	6.46	7.15
Gas (Billion Cu Ft)	Apr.	91.10	78.23	76.58
Sales (Billion Kwhr)	Apr.	32.31	32.53	31.75
Residential	Apr.	9.93	10.15	8.86
Commercial	Apr.	5.62	5.60	5.15
Industrial	Apr.	14.60	14.67	15.46
Other	Apr.	2.17	2.10	2.28
Net Income Class A & B Companies ($ Million)	Apr.	96.05	94.29	87.29
Estimated Dec. '54 Peak ‡(Million Kw)	Apr.	88.4	88.5	92.1
Kwhr per Residential Customer (12 Month Average)	Mar.	2,398	2,382	2,211
Revenue per Kwhr Residential Service (12 Month Average)	Mar.	2.72¢	2.73¢	2.76¢
Canadian Production (Billion Kwhr)	Apr.	5.65	5.77	5.74

Business Statistics

FRB Industrial Production Index†	May	123*	123	136
Gross National Product Annual Rate ($ Billion)	1stQtr.	357.8	363.5	363.9
EW 4 Industry Production Index†	Apr.	115.1	116.7	126.5
ENR Construction Cost Index††	June	130.5	129.7	124.4
BLS Consumer's Price Index	May	115.0	114.6	114.0
NEMA Insulation Materials Sales Index†	Apr.	124	136	189
NEMA Electric Appliance Sales Index†	Apr.	96	105	118
NEMA Household Refrig. Sales Index†	Apr.	73	89	96

*Prelminary **Revised ‡Class I Systems †1947-49=100 ††1949=100

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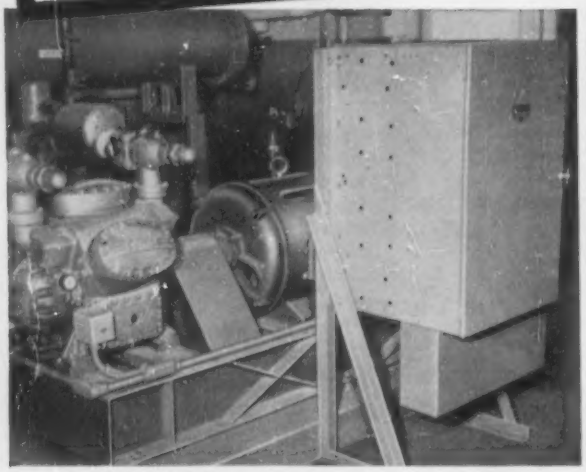
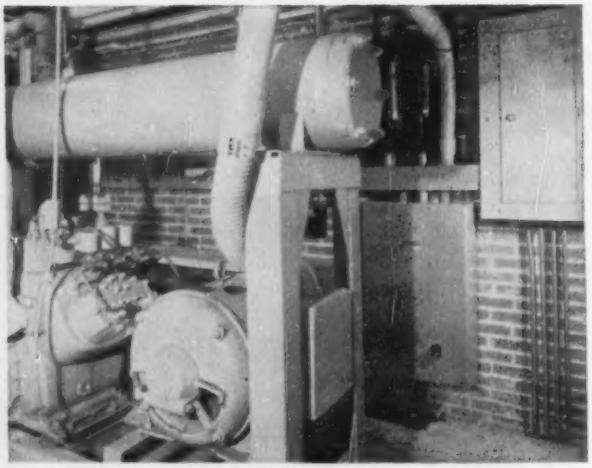


This 100 hp 3 step increment start motor, with double extended shaft, drives two refrigeration compressors in an Atlanta hospital.



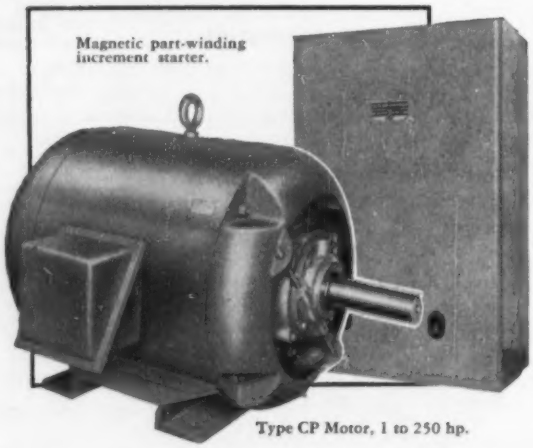
A 40 hp open type high torque motor with an increment starter, drives this compressor in a Houston office building.

with the Wagner Increment Motor and Starter Combination

You benefit when you install a Wagner Increment Motor and Starter "package" because you get a most economical, highly efficient motor and starter combination that limits inrush of motor current to values that are acceptable for the distribution systems of most power companies.

Wagner two-step starter combinations are suitable for most applications. A three-step increment starter is available for applications calling for unusually low inrush of starting current.

Your nearby Wagner engineer will be glad to help you select the combination that meets *your* requirements. Call the nearest of our 32 branch offices, or write us.



Magnetic part-winding increment starter.

Type CP Motor, 1 to 250 hp.

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M54-14

THE ELECTRICAL WEEK

The Issue's News Highlights . . . Congress clears away appropriations bills for power agencies. High loan authority fund for REA sustained.

California Congressman introduces bill requiring purchase of American heavy electrical equipment for federal and federally licensed hydro projects.

Hot dispute over AEC-private utilities power supply contract threatens to upset timetable for consideration by Congress of atomic energy law changes.

In Portland, Ore., last week, the Hoover Commission Task Force on Water Resources and Power heard C. S. Thayer of Alcoa declare the aluminum industry could not operate in the Pacific Northwest without "subsidized" power. "A very slight increase in power rates," he said, "might seriously reduce the attractiveness of the Northwest as a site for future aluminum smelting facilities."

In a three-way statement, Pacific P&L, Portland General Electric and Washington Water Power endorsed local participation in construction of power facilities; opposed creation of any single new government agency that would have authoritarian power over regional development.

Exclusive federal development was supported at the hearing by E. W. Kenney, International Woodworkers of America, CIO. No private agency, he said, will or can sacrifice profits solely to provide for "social and economic justice."

Conference Group on Coordination of Electrical Industry Sales and Promotional Programs announced its major objective for the immediate future would be aggressive promotion of adequate wiring at the point of sale—a local-level drive.

Seventy-eight per cent of 8,500 homes surveyed by Consolidated Edison Co of New York in its service area were found to be inadequately wired to supply appliances already installed. About 42% of the homeowners surveyed (they represent 1% of the total in Con Ed's territory) said they intended to buy additional heavy duty appliances such as air conditioners, broilers and electric laundry dryers. The catch: Only 12% of these homes have wiring capacity to carry the load.

Pacific Northwest Governors Power Policy Committee endorsed ten-year construction program submitted by its engineering subcommittee. Plan calls for 36 federal, non-federal and "partnership" projects.

Negotiating for the first time by collective bargaining, 1,000 non-supervisory professional and technical employees of Pacific G&E have received a 5½% wage increase.

Off the Washington Wire . . . Frederick Stueck, 48, a St. Louis lawyer and former chairman of Missouri Public Service Commission, was named to the five-man FPC to succeed Democrat Dale E. Doty. If confirmed by the Senate, Missouri Republican Stueck will be the fourth member of the present FPC with previous experience on state utility commissions.

Joint Congressional Committee on Atomic Energy voted down an initial move to censure the Eisenhower Administration for ordering AEC to shift from TVA to private utilities for a block of its power needs (Earlier story on Page 8).

At his weekly press conference, the President said one reason he ordered AEC to contract for private power in the South is that Northern states like New York and Massachusetts were complaining that the government took their taxes to build TVA installations that induced northern industry to move south.

Look for an announcement soon of another promising new power reactor design from an AEC installation. This would be in addition to the liquid metal fuel reactor (EW, June 28, p 93) and the five reactor systems in AEC's five-year development program (EW, March 15, p 7).

REA approved loans totalling $3.6 million to six distribution co-ops in north central Minnesota to buy the properties of General Minnesota Utilities Co, integrate the acquired properties into co-op systems and build 685 miles of distribution lines.

John Oliver, general manager of Tennessee Valley Authority, resigned to enter private industry. His assistant, Aubrey J. Wagner, named to succeed him.

Voters in the La Grande, Ore., area, will have a second chance on Aug. 13 to authorize purchase of local California-Pacific Power Co properties by Union County PUD. They turned the proposal down in May, but new petitions prompted PUD directors to schedule another election.

North Carolina Public Utilities Commission approved a $190,000 rate reduction by Carolina P&L for customers in the old Tide Water Power Co area, effective on August 1 . . . FPC ruled that a rate providing for $419,400 a year increase on Pacific G&E sales to Sierra Pacific Power Co is "not unlawful."

Executive Changes . . . Illinois Power Co elected three new vice presidents. They are: Karl F. Bader, who also is secretary; and D. Robert Davies and Harold G. Meenen, formerly assistants to the president.

ASME nominated David W. R. Morgan, vice president of Westinghouse Electric Corp, as its new president at a semi-annual meeting held at Pittsburgh.

REA Boosted in '55 Power Budget

No major reductions made in President Eisenhower's requests as House and Senate conferees split the difference between amounts approved by each chamber

Working at election-year speed, Congress by last week had cleared away all the appropriations bills for federal power agencies.

With a few exceptions, House and Senate conferees pretty well split the difference between agency funds voted earlier by the two houses. Cuts made in Presidential budget for fiscal 1955 amounted mainly to bookkeeping entries rather than actual cutback of construction programs.

Most significant change came in Rural Electrification Administration's loan authority request (see table) on which the two houses vied against each other to see which could be the more generous. The President had approved a $55 million loan authority request for farm electrification. The House upped this to $100 million and the Senate to $135 million.

The House asked for no compromise between the two figures—it accepted the higher one. This would appear to clear the way for a $200,000 study on the feasibility of using atomic power plants to serve rural loads. With carryovers and revisions of previously approved loans, REA will have nearly $200 million available for rural electrification loans in the next fiscal year.

Tighter on Others . . . Other power agencies received less generous treatment.

Congress slashed some $7 million off the President's request for Bonneville Power Administration. The conferees left in a $1.4 million item for BPA transmission facilities to serve the Coos Bay area, but trimmed other main grid projects requested in the Presidential budget.

Bureau of Reclamation received kind but not over-generous treatment from Congress, which allocated the agency some $200,000 more than requested by the President. The House-Senate conferees trimmed $1.4 million off the $13.4 million voted by the Senate for Missouri River Basin transmission facilities.

The House-Senate group also directed Reclamation to study the feasibility of substituting a 230-kv transmission line from the most advantageous point on the bureau grid system in South Dakota to a point in Nebraska near the state line. If found feasible such a line would be constructed in lieu of a 115-kv line from Gavins Point Dam into Nebraska for which funds were appropriated last year.

Funds were specifically withheld for any construction on the Trinity River Project in the Central Valley of California.

SPA Funds Upped . . . Congress increased funds for Southwestern Power Administration from the $1 million originally requested to $1.7 million. Of this, $1.1 million is to be available for implementing interim contracts between SPA and five generating and transmission cooperatives in the SPA area. However, the House-Senate group insisted that:

"Permanent contracts be completed between the SPA, the rural electric generating and transmitting cooperatives, and private electrical utilities in the area at the earliest possible date, so that this appropriation for 'interim' contracts will be sufficient to carry through the period of both contract negotiations and construction of necessary physical connections."

TVA Directive . . . House economizers lost their battle to hold the Tennessee Valley Authority funds to the $103.6 million earlier voted by that body, but did succeed in charging up TVA's transmission line construction to the corporate fund rather than to direct appropriations.

The incoming (though not yet appointed) chairman of TVA was directed to determine whether the agency's resource development activities can also be financed from the corporate fund.

Power Money Congress Passed for Fiscal '55:

(Millions of dollars)

Agency	Budget Request	House	Senate	Congress
Interior Department				
BPA	36.8	23.9	32.9	29.5
SPA	1.0	.6	2.3	1.7
Sepa	1.4	1.2	1.2	1.2
Reclamation Bureau	155.3	140.2	164.2	155.5
Agriculture Department				
REA (Electrification loan authority)	55.0	100.0	135.0	135.0
Independent Offices				
TVA Salaries and construction	141.8	103.6	129.6	120.0
AEC Operations	1,105.6	1,093.5	1,102.8	1,098.0
AEC Plant and equipment	236.3	96.5	130.0	110.8
FPC Salaries and expenses	4.1	4.1	4.1	4.1
SEC Salaries and expenses	4.8	4.7	4.8	4.75

'Buy American' Bill

Shelley introduces measure requiring purchase of U. S. equipment for federal projects

Congress got its first look last week at proposed legislation for a near-absolute "Buy American" act applicable to purchases of heavy electrical equipment for federal power or federally licensed power projects.

The bill was introduced by John F. Shelley (D-Calif.) as the House opened debate on the Administration's $3.6-billion foreign aid program. While no immediate action on the Shelley bill was scheduled, it did gain the favorable attention of several legislators.

Surprise Move . . . There was an element of surprise in the Shelley move since the California Congressman is an ardent supporter of reciprocal-trade principles and has often argued for lowering trade barriers between nations. Before coming to Congress in 1949, Shelley was California state president of the American Federation of Labor.

But in the 7,000-word speech which accompanied introduction of the bill, Shelley said he saw no conflict between freedom of commercial trade and his proposed bill. While private interests may buy in a world market, he said, "the first duty of the federal government lies here at home with domestic industry and labor."

The long speech dealt mainly with the case history of competitive bidding on 16 turbine governors to be installed at the federal Dalles Dam in Oregon, although Shelley also called attention to numerous government electrical equipment contracts awarded to foreign bidders.

Local Firm Underbid . . . Low American bidder on The Dalles Dam turbine governors was the Pelton Water Wheel Co located in Shelley's home district of San Francisco. However Japanese and Italian firms underbid the Pelton firm. According to Shelley the foreign firm bids did not meet Army Corps of Engineers specifications for the equipment and new invitations have been extended to all bidders.

This move, said Shelley, will give the foreign firms an even better chance to undercut American bids. "The Dalles contract is lost unless drastic action is taken to forestall rebidding and to force acceptance of the low valid bid."

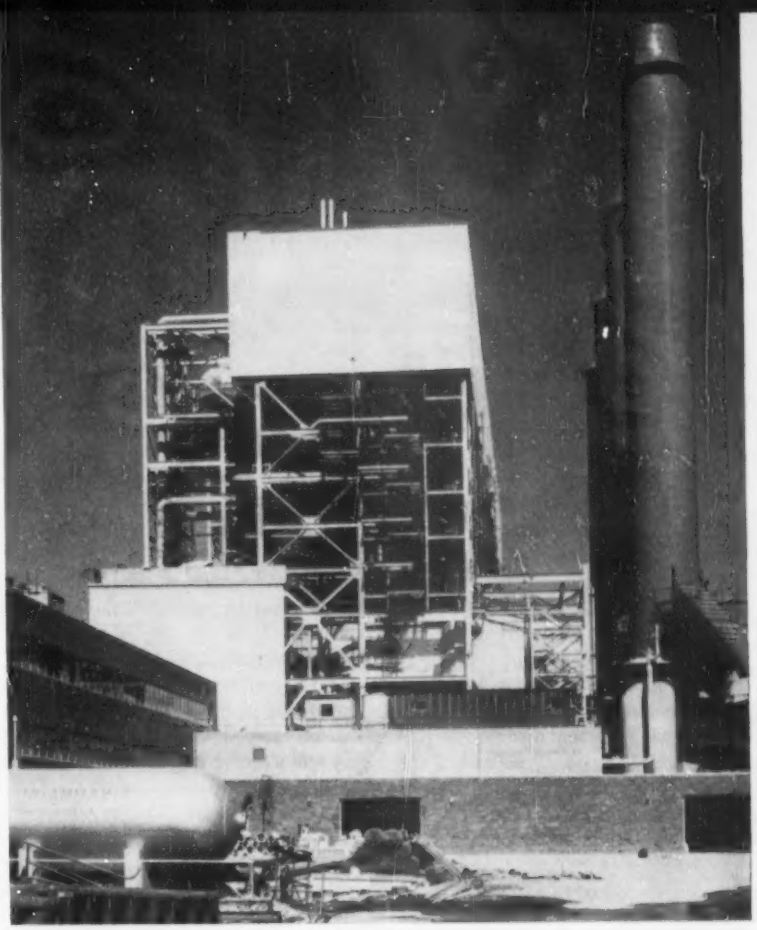
Shelley accused the State Department of intervening with government purchasing agencies to promote the acceptance of foreign bids. "It is pretty clear," he continued, "that they [State Department employees] have sold themselves on the idea that their job is to act as salesmen within the government and to the American people for the foreign interests with whom they have dealings."

If properly administered, Shelley conceded the present "Buy American" regulations might be sufficient. However, he said, recent government action in this regard demanded more rigid legislation.

Provisions of Bill . . . The Shelley bill (HR 9696) reads in part:

". . . equipment to be used in producing, controlling, distributing, modifying, or rectifying electrical energy, and parts and accessories therefore, which are to be installed in connection with any hydroelectric or thermal electric power projects heretofore or hereafter authorized by law to be constructed in the U. S. or the territories or possessions thereof by a department, agency, or other authority in the executive branch of the government, shall be manufactured in the U. S. or the territories or possessions thereof . . ."

The same would apply for all water power projects licensed by Federal Power Commission under the Federal Power Act.



New Contra Costa Landmark

Approximately 80% complete and being readied for initial operation in the autumn, Pacific Gas & Electric Co's Pittsburg Steam Plant has become a new landmark on the Contra Costa County shore of upper Suisun Bay. The $75-million structure, which will have a generating capacity of 600,000 kw, will be the largest steam plant west of the Mississippi. It is 150 ft high, and the stacks are about 210 ft high.

Side Issue May Stall Atom Bill

Public-vs-private power dispute on how to meet AEC's energy needs threatens schedule for changing McMahon Act

A seething public-vs-private power dispute over Atomic Energy Commission's electric power requirements threatens to overturn the timetable for vital legislative changes in the Atomic Energy Act.

The changes, designed to promote industrial development of atomic power and permit exchange of atom information with friendly nations, were to be reported to Congress this week. Congressional sources think that they have a fair chance of passing unless attention is diverted to side issues.

Most threatening side-issue trap is the controversial power supply contract which President Eisenhower has directed AEC to negotiate with a utility group comprised of Middle South Utilities Co and the Southern Co. These companies are headed by Edgar H. Dixon and E. A. Yates, and the private proposal was submitted in their names.

Dixon-Yates Proposal . . . Under terms of the Dixon-Yates proposal, AEC would contract for 600,000 kw of power from a private plant to be built at West Memphis, Ark. This block of power would be delivered into the Tennessee Valley Authority system at Memphis, Tenn., and a like amount of power would be delivered by TVA to the AEC gaseous diffusion plant at Paducah, Ky.

TVA backers claim the move is a subterfuge to block further TVA generation expansion. Congressmen from the valley are certain to join any move to head off consummation of the Dixon-Yates proposal.

A second Congressional committee, this one headed by crusading Republican Sen William Langer of North Dakota, moved in to probe the AEC-private utility contract last week.

Purpose of the Langer probe is:

1. To determine whether the specifications for the contract were written so as to eliminate competition.

2. To investigate whether any pressure was brought to bear to prevent competitive bidding.

Concentrates on Competitive Bidding . . . Witnesses lined up for the first hearing indicated that the committee would concentrate on the latter issue first. The witnesses were to be Walter Von Tresckow, a New York business economist who heads a group seeking the AEC power contract; Lucius Burch, Jr, Memphis lawyer for the Von Tresckow group; and David Sloan of the New York engineering firm of Gibbs & Hill which had been lined up to work on the Von Tresckow proposal.

Gibbs & Hill pulled out of the Von Tresckow lineup May 6 saying, "We are not participating in any activities detrimental to the private utility industry" (EW, May 17, p. 121).

The Langer committee wants to see whether the Gibbs & Hill action had resulted from pressure being brought by private utility groups.

The subcommittee first subpoenaed and later cancelled appearance of Middle South Utilities and Southern Co officials.

Besides the TVA-area lawmakers, there were indications that the AEC-private utility contract was also attracting the attention of other public power advocates in Congress. With a tentative adjournment deadline set for July 31, any drawnout debate on this side issue could easily sidetrack the whole atomic energy measure until next session.

The Joint Congressional Committee on Atomic Energy had taken a look at the AEC-private utility proposal earlier (EW, June 28, p. 88), then went back to marking up the final version of its broad atomic energy legislation.

Still to be threshed out as Electrical World went to press were several of the provisions in the general licensing sections of the bill.

On the controversial issue of patents it is understood the bill calls for compulsory licensing for basic patents in the atomic power field on a carefully prescribed basis.

Cable Laid Across Vineyard Sound

Despite 6-knot ocean currents, heavy weather and drenching rain squalls, a new submarine power cable was successfully laid in 1 hr 20 min on June 11 for Cape & Vineyard Electric Co between Falmouth and Martha's Vineyard, Mass. The work was carried out under the direction of C. T. Abbott, senior electrical engineer of New England Gas & Electric System.

The new connection crosses Vineyard Sound in a run of about 4.5 miles through a maximum depth of about 100 ft. It consists of 2/0 four single-conductor separate cables, to be operated at 24 kv ungrounded, with paper insulation, lead sheath, jute wrapping, and galvanized armor wire. Okonite Co manufactured the cable.

One cable is provided as an extra to minimize service interruption. A total of 24,750 ft of cable was purchased for the job. The new cable circuit has a firm capacity of 10,000 kva at 24 kv.

Uranium Game . . .

. . . between U. S., Belgium shifts to Congress where atomic law will be considered

How Congress overhauls the McMahon atomic energy law will provide the key in a fabulous international uranium game between United States and Belgium.

For both sides, the stakes are high:

- U. S. is out to protect its favored access to the free world's richest atomic fuel sources—in the Belgian Congo. Possibly 70% or more of our uranium comes from Belgian sources.
- Belgium is just as determined to gain technical information and processed uranium from the U. S. with which to start building a peacetime atomic power industry. Even though it controls a major source of nuclear fuel, Belgium is trailing its European and American neighbors in nuclear power development.

Legislation to be reported to both houses of Congress this week could break the impasse by permitting the U. S. to share a limited amount of its non-weapon atomic secrets and processed material with Belgium. The legislation, which key Administration officials consider vital, is tied up in the same package with that which would encourage domestic industry to develop nuclear power plants. If the industrial atomic power provisions bog down, they are willing to jettison it to save the international sharing provisions.

It's no secret that the first nation to benefit from these provisions for sharing information would be Belgium. In fact the main pressure for legislation this year comes from the State Department and Atomic Energy Commission which must negotiate an extension of our uranium supply contracts with Belgium this year.

U. S. Has Some Trump . . . But while Belgium does control one of our uranium lifelines, there are also some trump cards in the U. S. hand. There is, for instance, no worry that any of the Belgian supply would be diverted to Communist countries. Belgium is solidly on the anti-Communist side—as much so as any European country. Also the U. S. dollars now being exchanged for Congo uranium is a highly favorable factor in the Belgium economy.

At worst Belgium might divert a part of the U. S. supply to Britain, Norway, or some other European country in exchange for nuclear power information and processed materials. This might trim some of the U. S. effort in peacetime application of atomic energy, although it would not interfere with our preparations.

State Department planners fear that such a development would seriously damage U. S. prestige as a leader in the peacetime atomic power field. They are depending on changes in the law to head off this alternative.

The Belgians have been chafing under the Atomic Energy Act since it was passed in 1946 clamping a tight lid on military and industrial information in the atomic field. The law also prohibits export of enriched uranium —the kind best suited for present day use in atomic power plants.

For the past three years, the Belgians have been bearing down on U. S. officials for more technical information and processed uranium. In at least two ways, this has paid off.

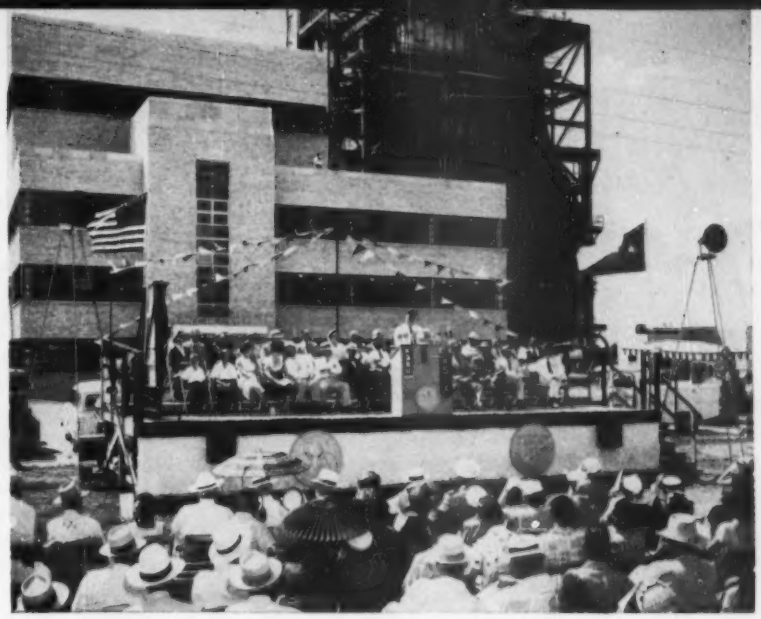
Two years ago the U. S. agreed to send Belgium 30 tons of uranium fuel elements suitable for use in a power reactor. At the same time Britain came through with enough refined graphite to moderate the fission in such a reactor.

In addition to materials, the U. S. also permitted a group of Belgian scientists and technicians to study an experimental power reactor at AEC's Oak Ridge, Tenn., installation.

Armed with the fuel elements, graphite and the information, the Belgians scaled up their atomic power plan—going from a zero power reactor to a 3,000 kw experimental reactor. But that's just the beginning.

What they want badly is some of the know-how which U. S. engineers have accumulated in building the power plants for the first atomic submarine—the Nautilus. With that kind of information and some more fuel elements, they'll be ready to start on their first full-scale power plant.

While Belgium waits for the U. S., the British are forging ahead, using Belgian uranium to build Europe's first big atomic power plants.



Lon Hill Plant Dedicated in Texas

Texas' power supply has been boosted 66,000 kw with the operation of Central Power & Light Co's new Lon C. Hill power station near Corpus Christi, Tex. Plant was dedicated June 17 to the service of the people of south Texas.

Main address at the dedication was delivered by Gov Allan Shivers. Highlight of the ceremonies occurred when plaque, which will be permanently installed in the plant, was unveiled. Inscription reads: "Lon C. Hill, president, Central Power & Light Co, for whom this station is named in recognition of his outstanding leadership and many enduring contributions to the development of south Texas . . ."

Second 66,000-kw unit for the plant is on order and is scheduled for operation early in 1956.

IN THE INDUSTRY

Reported expenditure by National Association of Electric Companies—$547,789 last year, $477,941 the year before—is scheduled to take a sharp drop in 1954. This is because the United States Supreme Court has limited application of the Lobbying Act to actions that involve direct contact with members of Congress in an attempt to influence legislation.

Supreme Court Reduces Reports Of Lobby Funds

This narrower interpretation would eliminate the requirement that NAEC report on total receipts and expenditures for all its activities. The association has done this in the past because it thought the law was too vague to permit allocation of funds.

The decision is interpreted by some to mean that funds collected for research activities, indirect public appeals for a general course of action, or appeals to special groups need no longer be accounted for in reports filed with Congress.

This would seem to hold especially if such activities are not directly connected with specific legislation either pending before Congress or soon to be introduced.

NAEC has many functions other than the direct contacting of legislators. One of its chief activities is keeping member companies across the country informed on the progress of legislation favorable to private power.

Objectives: Cutbacks . . . A major objective of the lobby group, its president, P. L. Smith, said recently, is keeping down appropriations to Tennessee Valley Authority and other federal power agencies—work at which NAEC was largely successful last year. The association also directs considerable activity toward convincing the people through pamphlets, booklets and other publications that government power is a dangerous threat to the private utilities.

Organizations such as the Electric Companies Advertising Program and the private utilities' Public Information Program appear clearly to be exempt from application of the lobbying act under the Court's decision, unless they plead for direct action on specific legislation. These have not registered in the past, but some doubt has been expressed by public power advocates as to whether these activities were subject to regulation as lobbies.

Public power organizations, such as American Public Power Association and National Rural Electric Cooperative Association, will be little affected by the Supreme Court interpretation. For the most part these groups in the past have reported to Congress only on expenditures made in connection with direct efforts to influence legislation, interpreting the law as the Supreme Court now has done.

The Lobbying Act was passed as Title III of the Legislative Reorganization Act of 1946. Main purpose was to give Congress some idea of persons or organizations attempting to influence the course of federal legislation and the amount of money they spend. To accomplish this, such persons were required to submit quarterly reports to the clerk of the House and secretary of the Senate listing contributors, amounts contributed, and expenditures.

District Court Reversed . . . A federal district court in Washington last year ruled the act invalid after concluding that its language was too vague to permit enforcement. A five-man majority of the Supreme Court reversed the lower court decision. After narrowing the interpretation of the statute, the majority held it was sufficiently clear to permit enforcement and that it did not violate the First Amendment to the Constitution, which insures individuals and groups the right to petition Congress.

Strong dissents came from Justices William O. Douglas, Hugo Black and Robert H. Jackson. Justice Jackson suggested the act was so vague that it should be rewritten by Congress. "After all," he said, "it is Congress that should know from experience the good in the right of petition and the evils of professional lobbying."

Another dissent, written by Justice Douglas and concurred in by Justice Black, said the formula adopted by the court to save the act "is too dangerous for use." To avoid the vagueness of the act, Douglas said, the Court had sought to apply it "only to those who are paid to 'button hole' Congressmen or who collect and expend moneys to get others to do so."

But the majority decision is what counts, so far as the law is concerned. And that decision, so far as the private power industry is concerned, means that for NAEC there will be less reporting required by Congress; for ECAP and PIP, an assurance their activities do not come under the act.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Induction generators are logical companions to gas turbines as the rotors are capable of high speed. They can start the turbines and need no exciter, no voltage regulator, no synchronizing, no frequency control.

Dielectric strength at an aging temperature may effectively be used to determine maximum life characteristics of magnet wire insulation.

Motoring of turbogenerator by power inflow from the system may overheat the blades in the low pressure cylinder. Automatic trip-off to prevent it will have to be circumvented during synchronization.

High voltage current and potential transformers have been reduced in weight and size largely through resort to crepe-paper insulation with two-way stretch.

Hollow-conductor wave-guide loss can theoretically be reduced to any desired extent by suitable increase of the cross-sectional area.

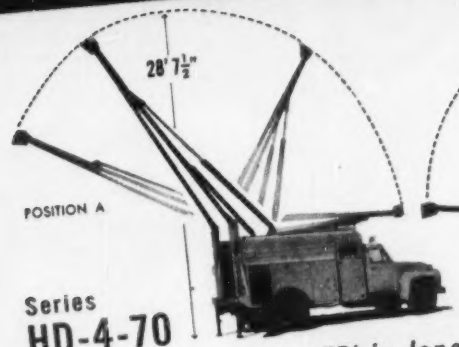
Scholastic averages of men hired by electronic manufacturers are above the class average but those of men hired by utilities are significantly below the class average.

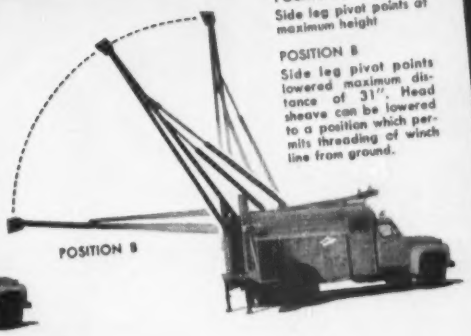
Conventional percentage differential relays are subject to false tripping on transient magnetizing inrush current. The current flows in only one winding when the transformer is energized and therefore produces operating current in the relay just as a true internal fault does.

Good lighting over the top area of a boiler should avert the maintenance neglect of leaking stop valves, etc that can corrode the boiler shell.

- POWERS *American*

"Pole-Master"
HYDRAULIC DERRICKS





POSITION A
Side leg pivot points at maximum height

POSITION B
Side leg pivot points lowered maximum distance of 31". Head sheave can be lowered to a position which permits threading of winch line from ground.

Series HD-4-70

Handles poles up to 75' in length

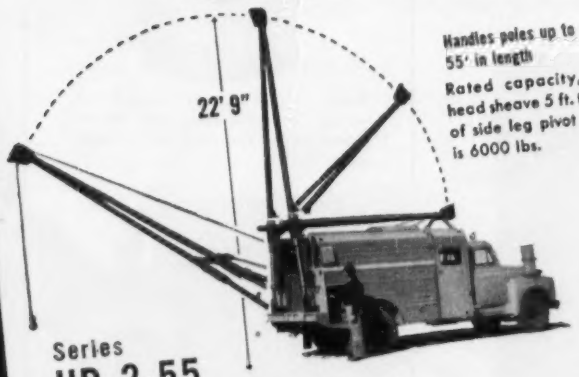
This is a heavy-duty derrick which can be operated by one man. Every movement—from carrying position to any point within the operating range—is hydraulically actuated. Shifting of control levers is the only manual requirement.

The derrick can be spotted in any position selected by the operator . . . and can be moved under load.

What's more, the position of the head sheave can be raised or lowered a distance of 31" . . . hydraulically . . . without changing angle of elevation.

With head sheave fully extended, 5 ft. to rear of side leg pivot points, the derrick has a capacity of 9000 lbs.

Complete details are given in Powers-American Bulletin No. 407. A copy, with quotation, is yours for the asking.



Handles poles up to 55' in length

Rated capacity, with head sheave 5 ft. to rear of side leg pivot points, is 6000 lbs.

- LIVE BOOM — CAN BE OPERATED UNDER LOAD
- HYDRAULIC HEIGHT ADJUSTMENT
- CAN BE USED WITH SINGLE-DRUM WINCH
- NO BODY LOAD AREA OBSTRUCTION — NO DANGEROUS EXPOSED MECHANISM

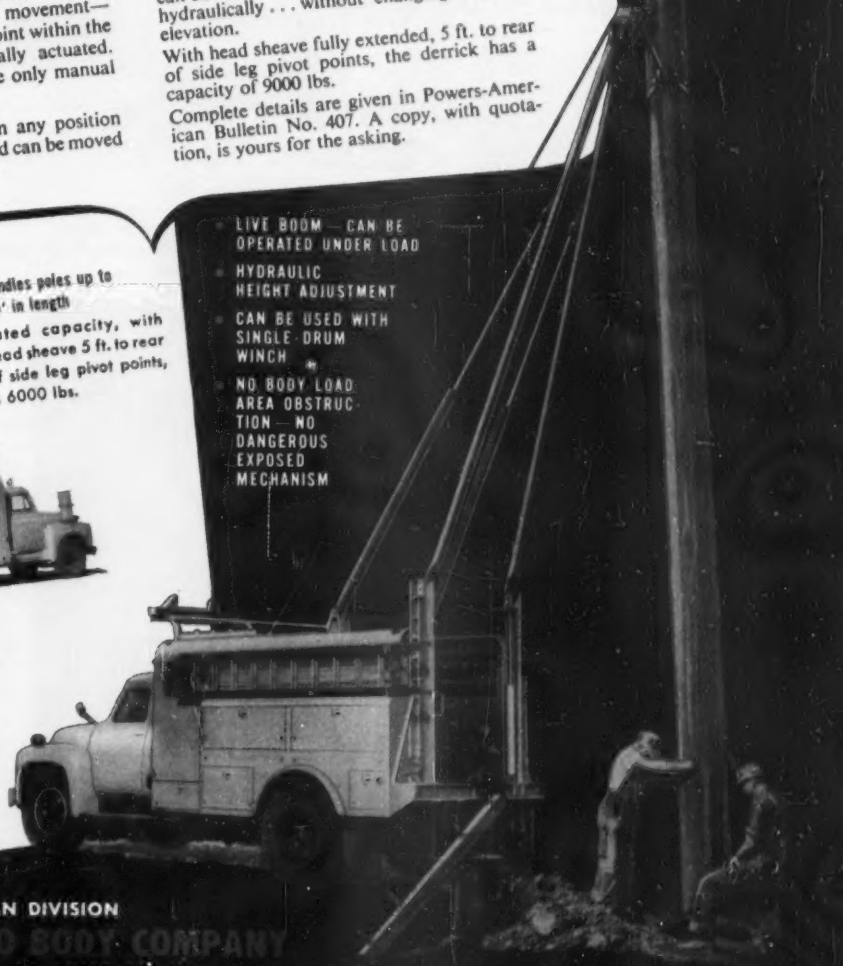
Series HD-2-55

Operation is completely hydraulic. Insertion and removal of locking pins, and shifting of control is the only manual requirement.

The derrick can be spotted in an unlimited number of positions, and moved while under load. It will lift loads to body cargo area.

Descriptive Bulletin No. 405R, with quotation, will be sent on request.

SERIES HD-2-40 Same as above, with 20' 10" ground-to-head sheave height.



POWERS-AMERICAN DIVISION

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY • ST. LOUIS 15, MO.
428 LATHAM SQ. BLDG. • OAKLAND 12, CALIF.

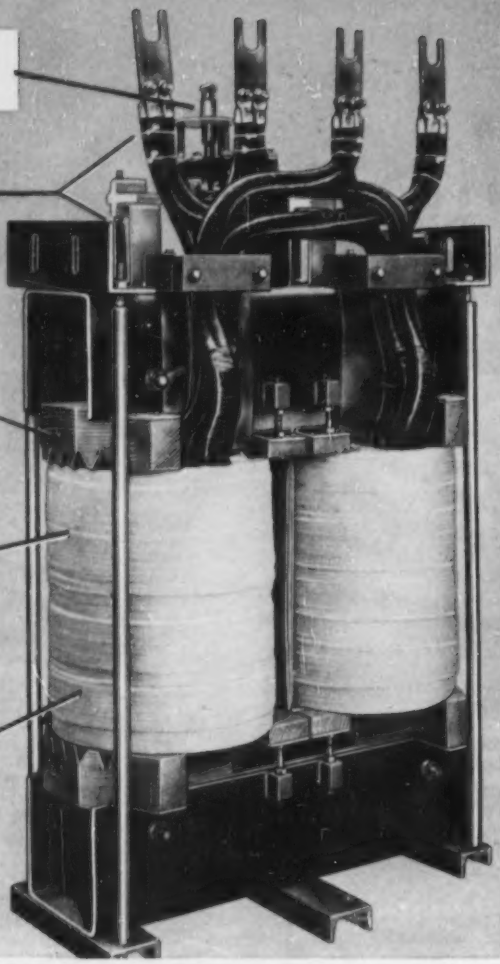
1 Long creepage distances on tap-changer.

2 Leads are carried well away from frame, and are protected with insulation barriers.

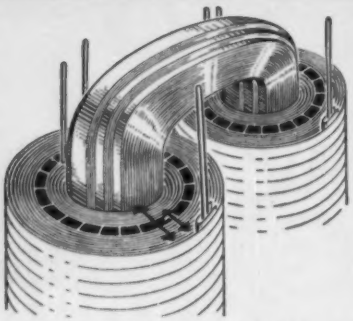
3 Strong oil-impregnated maple blocks assure ample distance between coils and grounded frame.

4 Round coils are not malleted into shape; there are no corners or sharp bends that might contribute to insulation failure.

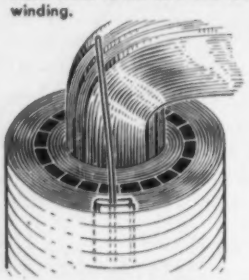
5 Core and coil assemblies are carefully processed to assure removal of moisture and air, then oil-impregnated under vacuum with ORTO.



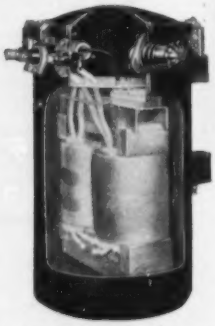
Round-Wound core-coil assembly. This construction offers the designer a number of opportunities to get maximum effectiveness from insulation materials, and to secure the greatest possible leakage distances. The illustration shows points at which we take special advantage of the design to coordinate insulation puncture resistance and creepage distance to get highest possible impulse level.



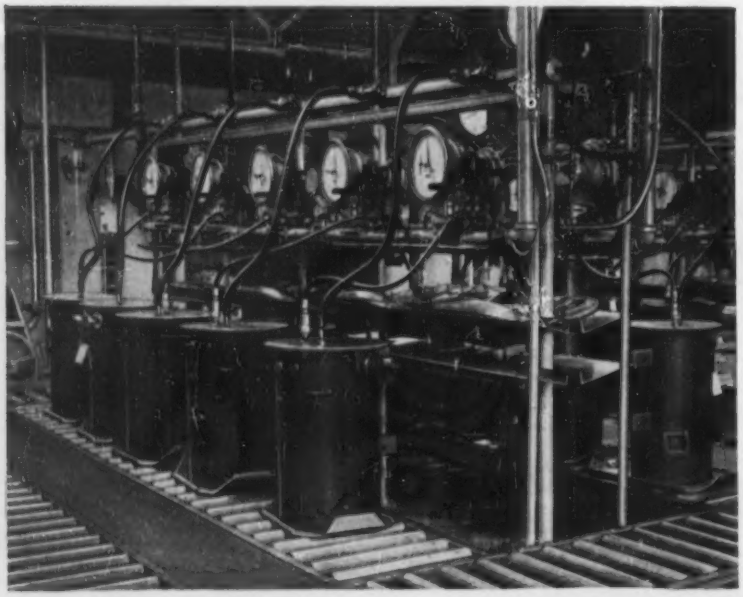
The low-voltage winding and leads, easiest to insulate, are wound next to the core. High-voltage line leads are located on the outside of the coil. Note that long creepage distances are obtained from these leads to the core and low-voltage winding.



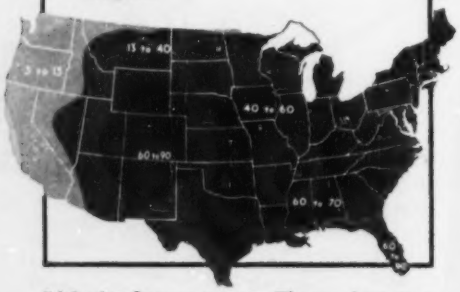
Folded pads of insulating paper give special protection to leads where they emerge from the coils.



There is ample distance between high-voltage leads and tank wall. Oil level is well above core and coil assembly live parts.



After controlled removal of moisture from the core and coil assembly, thorough oil penetration and complete absence of corona-producing voids are assured by vacuum oil-impregnation with dry, de-aerated ORTO, L-M's oxidation-resistant transformer oil, inhibited for longer life.



Lightning frequency map. Figures show average thunderstorm days per year. L-M Round-Wound transformers prove their high impulse strength in such areas.

Get This New Bulletin

High impulse strength is only one of the many advantages of L-M Round-Wound transformers. We'd like to tell you some of the others. Ask the L-M Field Engineer for a copy of the new Bulletin DT1; or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

Round-Wound design provides round coils, wound directly onto the wound core. Coils are not malleted into shape. Minimum handling assures great freedom from possible damage to insulation, with resulting high impulse strength.

Oscillographic observations of impulse test. Destructive testing of units incorporating new materials, component parts, or design and processing changes assures effectiveness of design as well as manufacturing quality

High Impulse Strength Inherent In L-M Round-Wound Transformer Design

How the transformer designer takes advantage of many related factors contributing to reduced failures from either lightning or switching surges.

by **ROBERT P. THOMPSON**
Assistant Chief Engineer
Transformer Division
Line Material Company

Uniformly high impulse strength is an important factor in the excellent service record of L-M Round-Wound* transformers. High impulse strength, or level, is the result of a number of factors, each of which is important in arriving at an over-all good result.

Requirements For High Impulse Level

Lightning damage occurs when a lightning surge flashes over inside the transformer, and is followed by a 60-cycle current arc. Often extensive permanent damage is caused by the follow current.

Severe switching surges can also cause unusual and sometimes destructive stresses in transformer insulation.

Any weak spot in insulation is an invitation to trouble. Damage to insulation during manufacture, even though slight, can prove to be serious.

Insulation puncture resistance and creepage distances must be correlated for optimum insulation performance. Contaminants, such as moisture, must be strictly controlled. Thus, no single factor can be overlooked.

Round-Wounds Easy to Insulate

Fortunately, the Round-Wound design inherently allows insulating materials to be used with maximum effectiveness.

Since the design provides for round coils wound directly onto an already annealed, uncut core, handling is reduced, thus minimizing the possibility of resultant damage.

The coils, being round, are not malleted into shape during winding; nor are there any corners of short radius in the windings which could contribute to insulation failure. The result is a coil whose insulation has in no way been impaired.

L-M engineers take full advantage of the physical characteristics of the core-type design in coordinating puncture strength and creepage distance. Locations where higher voltage stresses occur, as where leads emerge, are treated with special consideration.

Round-Wound core and coil assemblies are carefully processed to assure removal of moisture and air and then are thoroughly vacuum oil-impregnated with clean, dry ORTO®, L-M's oxidation-resistant transformer oil.

The result of this precise care is uniformly high dielectric strength under both surge and 60-cycle stresses.

Customers' Experiences Confirm Round-Wounds' High Impulse Level

With the majority of users, the high impulse strength of L-M's Round-Wound transformer is generally taken for granted. But for some there exist conditions more severe than the day-to-day opposition to switching surges. From operators located in areas with a high incidence of thunderstorms comes gratifying proof of the uniformly high impulse level of the Round-Wound transformer.

Ray W. [illegible]ward, Manager of the San Luis Valley Rural Electric Cooperative, Monte Vista, Colorado, writes:

> **"Our area averages over 175 thunderstorm days per year. Both our laboratory tests and our field experience indicate an exceptionally high impulse level for Round-Wound transformers. Our total failure rate for Round-Wounds is less than ¼ of 1% a year. Therefore, we have increased our purchase of Round-Wound each year."**

Another executive whose company operates in a high lightning frequency area writes:

> **"In our territory, extending from the plains at 3500 feet to points well over 10,000 feet in the heart of the Rocky Mountains, we have hundreds of thunderstorms each year. We have found that Round-Wound transformers stand the gaff. Our failures have been so few that we are buying more L-M Round-Wounds."**

*"Round-Wound" is a Line Material Company trademark.

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LINE MATERIAL *Transformers*

THE MOST IMPORTANT LINE IN AMERICA

It's America's lifeline, really — the power line that starts with steam and brings heat, light, and energy to the nation's factories, farms, homes and stores. Paralleling that line is the line of cost, which America's Utilities have striven mightily to reduce over the years. Even today, with vast increases in the cost of all the things America's privately owned electric companies must buy, the cost of electricity has not increased in proportion.

Since 1881, when Thomas A. Edison opened the nation's first electric generating station, B&W, who supplied his boilers, has pursued a fruitful, continuing search for better and better ways to generate steam and to harness more and more usable energy from fuel consumed.

Economical, dependable service is the watchword of America's Electric Companies. The chart reflects how well their all-important job is being done. And to help insure that electricity will remain America's best bargain, B&W Research and Engineering dedicates men, money and machines to continuing progress in steam and fuel technology.

Light's Diamond Jubilee
Light for Freedom — Power for Progress

BABCOCK & WILCOX

BOILER DIVISION

N-183-A

PRESIDENT-ELECT A. C. MONTEITH of American Institute of Electrical Engineers (left center) is congratulated by incumbent Pres E. B. Robertson (opposite) as new Secretary N. S. Hibshman (left) receives best wishes from retiring Secretary H. H. Henline

Atom Needs No 'Crash' Program: Cisler

President of Detroit Edison Co tells AIEE Summer General Meeting development should be on economically realistic basis

"Development of atomic power, although urgent, does not require a 'crash' program, but it should be undertaken on an economically realistic basis," Walker L. Cisler, president of Detroit Edison Co, told the Summer and Pacific General Meeting of the American Institute of Electrical Engineers in Los Angeles, June 21-25.

AIEE President-elect A. C. Monteith, Westinghouse Electric Corp, urged the institute to consider a broad educational program to acquaint government and business with the achievements and management capabilities of engineers. In his closing report as Institute President, Elgin B. Robertson pointed out that engineers must establish standards of professional attainment if they are to attain recognition as a profession.

In outlining a realistic approach to atomic power, Cisler said any development program must give particular attention to cost factors involved. This approach will help avoid undue expense and unnecessary waste of materials and effort. The electric power industry has a special responsibility in carrying out the development work, he said.

Fast Nuclear Advance . . . Reactor technology has advanced rapidly, Cisler said, but a large amount of work still must be done before the available science and technology may be translated into reactors that are economically practical for power system use. Because loads continue to grow, the electric power systems must continue to expand their power generating facilities. The best estimates show that from 7 to 12 million kw of new capacity will be needed annually. More than 90% of this capacity must be in thermal units, Cisler stated. And he re-emphasized that amendment of the Atomic Energy Act is necessary before the power industry can participate with full effectiveness in the development work.

Monteith, who will assume the presidency of AIEE on August 1, said, "Engineers do a wonderful job of running the slide rule but only a fair job of interpreting what they are doing."

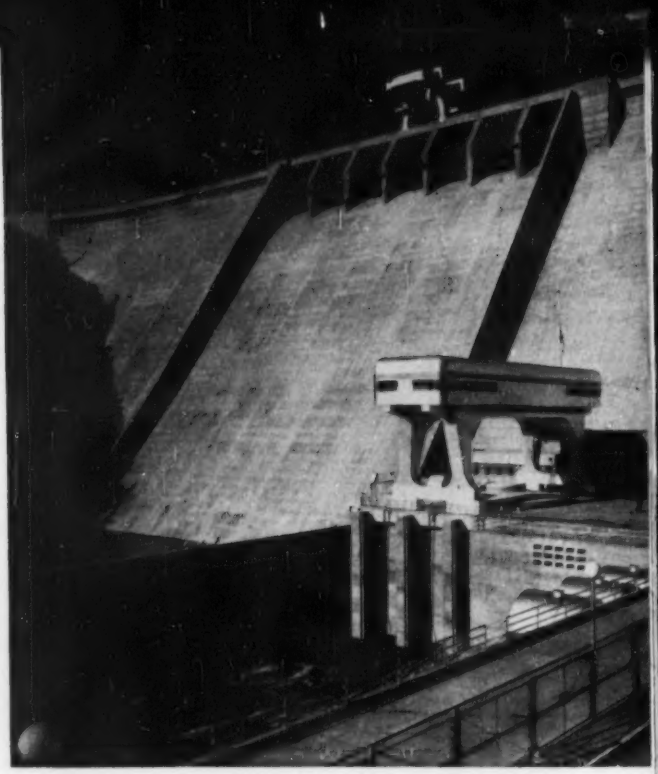
A broad educational program is essential to show the tremendous contributions engineers are capable of bringing to positions of management and leadership in government and business, he added.

There is another problem that needs our concentrated attention, Monteith said. We must press for greater cooperation among branches of engineering to develop a unified group and to set out for common objectives.

"We will strive," he said, "to weld the branches of AIEE into a more closely knit institute and affiliate it more effectively with the larger society of engineering."

(Continued on page 38)

Plan to pump water into storage reservoir during off-peak periods by means of a single hydraulic machine capable of operating at high efficiency as both turbine and motor-driven pump has fruition in . . .



HIWASSEE DAM, powerhouse and switchyard where the largest pump-turbine yet built will be installed. Its capacity is 70,000 kva. As a

TVA Installing Largest Pump-Turbine

DON H. MATTERN, Assistant Chief, Project Planning Branch, Tennessee Valley Authority, Knoxville, Tenn.

The largest pump-turbine built or designed to date is currently being installed at Hiwassee dam on the Tennessee Valley Authority system. This machine will rotate in one direction as a pump and in the opposite direction as a turbine.

Pumping water from one level to a higher one during off-peak periods is not a new idea. Numerous installations of this kind have been in operation for many years in Europe, and the first such American installation was the Rocky River project at New Milford, Conn., built in 1928.

These installations, however, require two machines, one to operate as a turbine-generator and the other as a motor driven pump. A single hydraulic machine capable of operating at high efficiency as both a turbine and pump is a recent development.

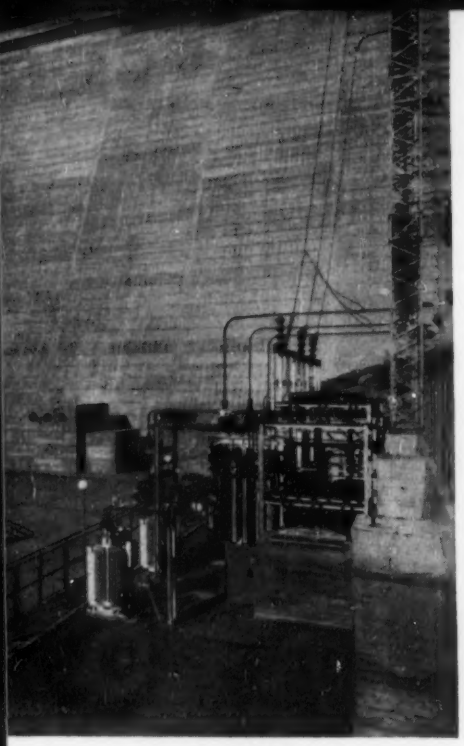
Major Features . . . Nominal rating of the unit operating as a turbine is 80,000 hp at 190-ft head. For operation as a pump, the reversible unit is rated at 3,900 cfs against a head of 205 ft. At this head, the pump will require a motor output of 102,000 hp and have a specific speed of 2,560 on a gpm basis.

Because the maximum pumping load will occur during the portion of the year when the temperatures of water for cooling are low, a 15% overload capability was built into the motor-generator. As a motor, the unit will be rated at 102,000 hp and 80-C rise. As a generator it will be rated 70,000 kva, 60-C rise. Both motor and generator efficiency at these ratings are expected to be more than 97%.

Other Pump-Turbines . . . The Hiwassee unit will be the fourth installation designed to operate as a reversible unit. Already in operation or under construction are units at the Pedeira and Edgar De Souza plants in Brazil and at the Flatiron project of the Bureau of Reclamation's Colorado Big Thompson project. Three pump-turbine units will be installed in the Ontario Hydro Commission's Sir Adam Beck No. 2 plant at Niagara Falls. Installations at other locations are being considered.

Why Pumped Storage . . . At the foot of the Hiwassee dam is a semi-outdoor powerhouse (shown in the photo) with a 57,600-kw generator driven by an 80,000 hp Francis-type turbine. Downstream from Hiwassee is the Apalachia project, the reservoir of which will form the suction pool for the pump-turbine installation. A section through the Hiwassee dam and the existing generating unit is shown in Fig 1.

The possibility of making Hiwassee a pump-storage project was among the schemes of TVA development explored during the early planning stages. This failed to prove economically attractive then largely because of the high cost of installing a separate turbine and pump. Conse-



motor it will rate 102,000 hp and as pump will have capacity of 3,900 cfs at 205-ft head

at Hiwassee

quently, in the design of the project, space was left only for a second, similar conventional unit. The end of its penstock is adjacent to the powerhouse block.

To understand the function of the pump-storage unit at Hiwassee, it is necessary to consider briefly the operation of TVA's system of multiple-purpose projects. Major tributary projects, such as Hiwassee, provide a substantial amount of regulation of runoff from contributing watersheds. Operation of these tributary projects to secure flood regulation and power production is illustrated by the annual cycle of operation as planned for the Hiwassee project, Fig 2.

The amount of storage capacity reserved for flood control during winter restricts the rate of reservoir filling throughout the flood season.

Reservoir Cycle . . . The reservoir must be drawn to El 1,455 on January 1 to provide the scheduled storage capacity. It may be drawn lower if necessary for power production. De-

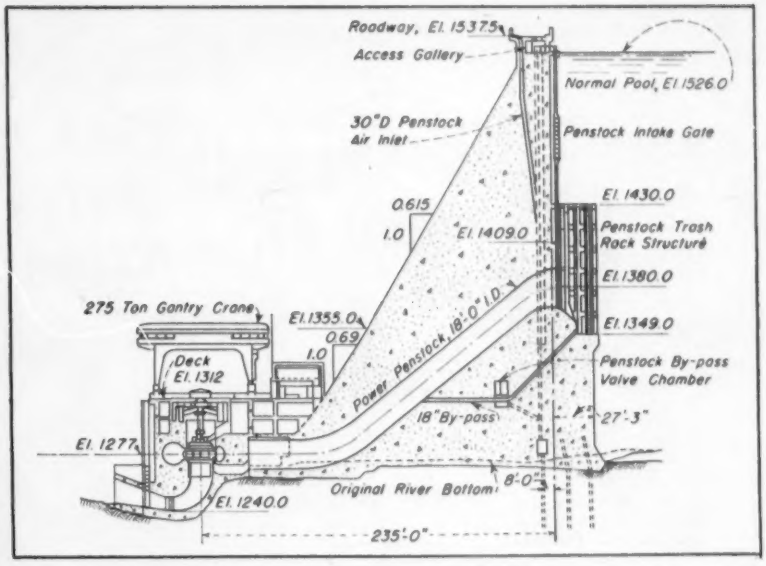


FIG 1—EXISTING GENERATING UNIT at Hiwassee, shown in cross-section, has capacity of 57,000 kw and is driven by 80,000 hp turbine. This is one of TVA's units dating to 1940

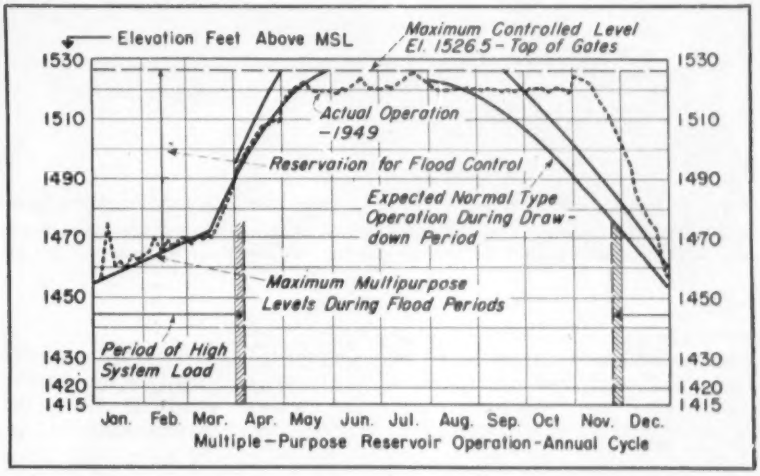


FIG 2—FLOOD CONTROL fixes multi-purpose reservoir's operating cycle. Reservoir must be drawn down between September and January when rain precipitation is heaviest in this area

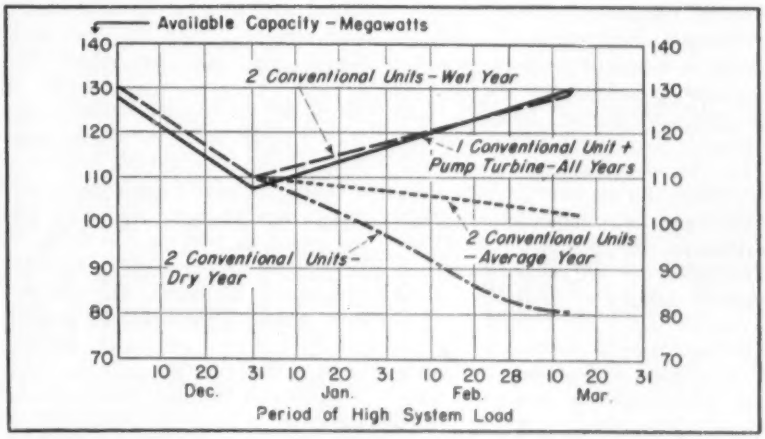


FIG 3—HIGH SYSTEM LOAD curves show that capacities available are increased most by pump-turbine during a dry year when extra conventional unit would add very little output

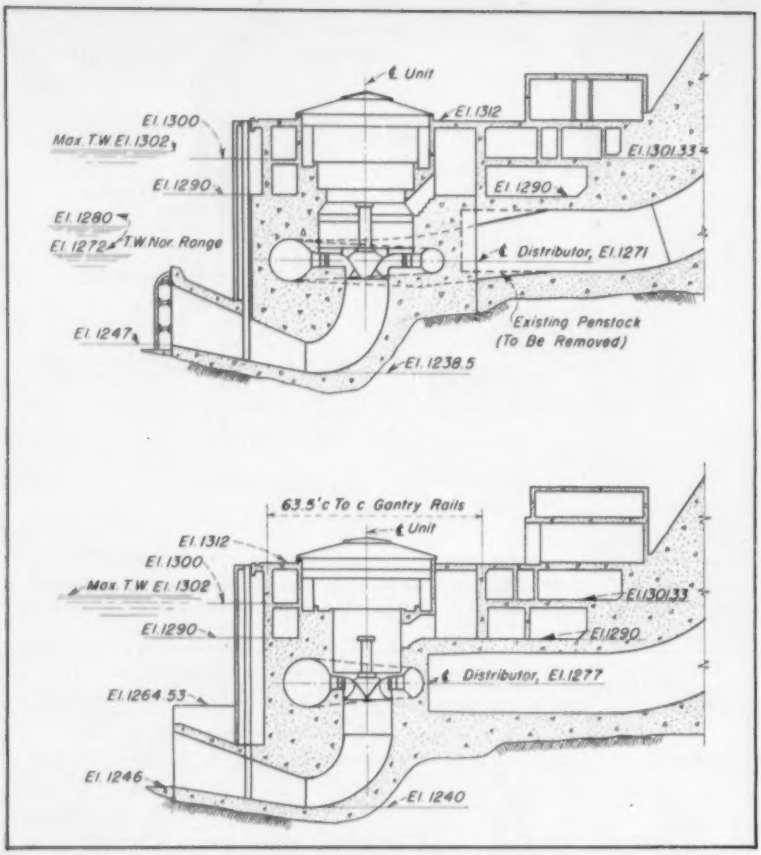


FIG 4—VOLUME of pump-turbine unit is the same as for the conventional powerhouse despite the many differences between the two, as shown in this comparison of transverse sections

pending on flow, the reservoir may be filled gradually, reaching maximum level during May. Draw-down normally takes place from September to January, completeing the normal cycle. The operating guide line is indicated by solid lines on the chart. Operation during 1949 is illustrated by the dotted line.

This type of operation usually results in substantial releases for power generation during the summer and fall as the reservoirs are drawn to lower levels. The annual draw-down, and the restrictions placed on the rate of filling during the winter to maintain reservoir volume for regulation of floods, limit the operating level and amount of available generating capacity during the early part of the year.

Power demands on the TVA system are heaviest at this time. Ordinarily, the load builds up during the latter part of December, reaches an annual peak in January, and eases off in late February and in March.

Contribute to Peaks . . . For economical system operation, the hydro peaking capability should be used to the fullest extent during the season of high system load. Hiwassee, like other tributary plants, can contribute effectively to peak loads on the system by operating about 50 to 60 hr a week from mid-December to mid-March, with somewhat fewer hours per week before and after this period. The principal value of a second unit at Hiwassee will be the peaking capacity it can add to the system capability at this critical time.

A typical week's operation at Hiwassee and Apalachia during the filling period early in the year is shown in Fig. 5. Maximum plant capacity is obtained by limiting the reservoir draw-down at Hiwassee to the amount for flood control operations, as indicated by the operating guide line. Operation along this line avoids extreme reduction of head and corresponding unit output.

In most years, stream flow is such that the present one-unit plant can utilize the water effectively while allowing the reservoir to fill at the maximum allowable rate. However, if a second conventional unit were installed, the greater releases required for peak operation of the two-unit plant during the winter would result usually in reservoir levels below those required by the flood control schedule.

Lowered Reservoir Level . . . An example of this condition is shown by the lower curve, Fig. 5 (Hiwassee operation). With draft during the week being substantially more than inflow, the reservoir level would be lowered. This lower headwater level would reduce the operating head and, consequently limit the power output of a two-unit plant. The middle operating curve, representing the headwater levels maintained by a pump-turbine, would be achieved by off-peak pumping which would return the on-peak releases to the reservoir.

The bar diagram illustrates the operation, pumping requirements, and generating output during the typical week for the present and two alternate installations. The two lower graphs illustrate corresponding levels, outputs, and operation of the Apalachia project during this same typical week.

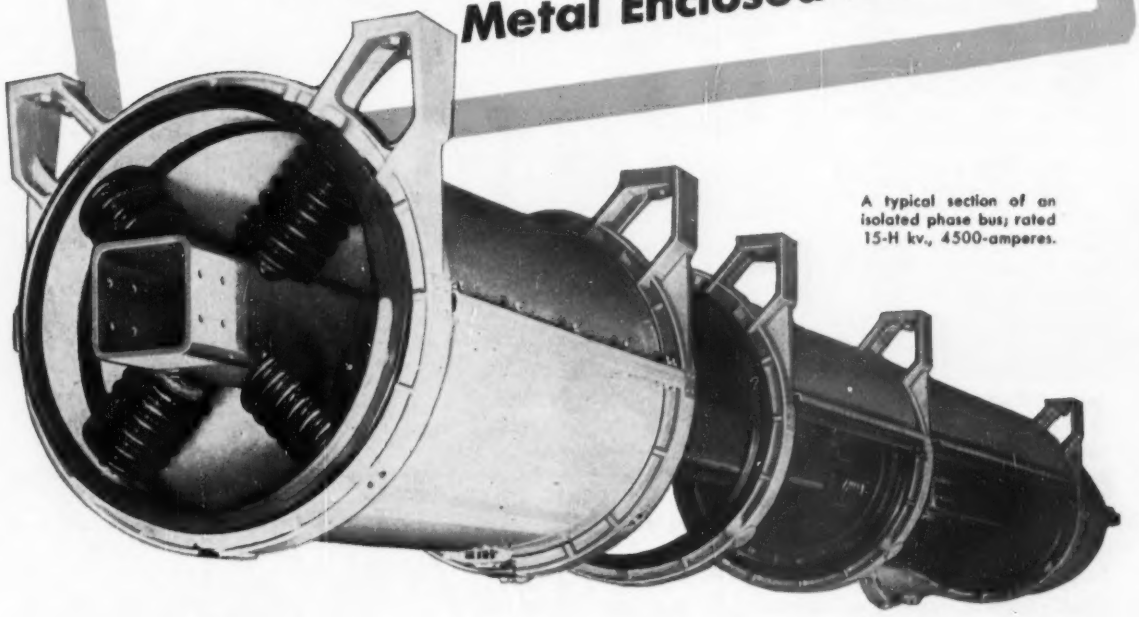
Kilowatt Capacity . . . The kilowatt capacity available at Hiwassee during the winter of a wet, an average, and a dry year for installations of either two conventional units or one conventional unit plus a pump-turbine are shown in Fig. 3. The increase in plant capability obtained by use of the pump-turbine will vary throughout the winter reservoir-filling period and will be greatest during years of low-stream flow.

As seen from the curves, the advantage of the pump-turbine becomes progressively greater throughout the winter, reaching as much as 44,000 kw by March 1 in a dry year. Much of this increased plant capability results from the greater output of the existing unit because of the maintenance of higher operating heads.

Cross-sections of the existing unit and the new pump-turbine are shown in Fig. 4. Gross volume in the powerhouse block is the same for both units, but there the similarity ends. The runner, or impeller, of the pump-turbine will be about 266 in. in diameter at the center line of the distributor, com-

(*Continued on page* 20)

A DIRECT PATH TO BETTER PROTECTION with DELTA-STAR Isolated Phase Metal Enclosed Bus Runs



A typical section of an isolated phase bus; rated 15-H kv., 4500-amperes.

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"Unit-type" metal-enclosed bus designs are available in a wide variety for isolated phase, segregated phase and non-segregated phase construction. Delta-Star's experienced engineers will make an analysis of your proposed installation and determine which type will be the most economical for your service requirements. Regardless of the type selected, you are assured of a design which will fit into your installation at lowest possible erection cost.

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Story starts on page 16

pared with 165.2 in. for the present unit. Out-to-out dimensions of the scroll case will be approximately 54 ft normal to the penstock, and 49 ft parallel to the penstock. This compares with 49 and 41 ft, respectively, for Unit No. 1.

Pump-Turbine Setting . . . The setting for a pump-turbine is determined by the relation between the pump impeller and the lowest elevation to which the suction pool can be drawn during the pumping cycle without causing serious cavitation. The center line of the distributor of the Hiwassee pump-turbine will be set 1 ft below the minimum elevation to which the Apalachia Reservoir might be drawn. This level is 6 ft lower than the setting of the turbine for the unit now in operation at Hiwassee.

However, since model tests indicated that the vertical lag of the pump-turbine draft tube can be 4.5 ft shorter than the draft tube for Unit No. 1, the resulting elevation of the bottom of the draft tube will be only 1.5 ft lower. This slightly greater depth of draft tube will require additional rock excavation within the powerhouse area.

The reversible unit will operate at 105.9 rpm both pumping and generating. This compares with 120 rpm for Unit No. 1. It is estimated that the unit will reach a runaway speed of 161 rpm, as compared with 235 rpm for the present conventional unit. Corresponding speed rise will be 52% and 96%, respectively. This lower overspeed potential, characteristic of a pump-turbine unit, can be taken into account when designing the structural features of the motor-generator.

Nominal rating of the unit operating as a turbine is the same as for Unit No. 1, that is, 80,000 hp at 190-ft head. Specific speed of the pump-turbine will be 42.1 as compared with 48.0 for the present unit. Sigmas at unit ratings are 0.20 and 0.14 respectively.

Plan Tests . . . Provision was made to test both Hiwassee units in the field by the pressure rise method during construction. Two-direction flow in the penstock introduces problems in measuring the large quantities of water. But it is believed that a satisfactory test can be made on the pump-turbine unit by the salt velocity method.

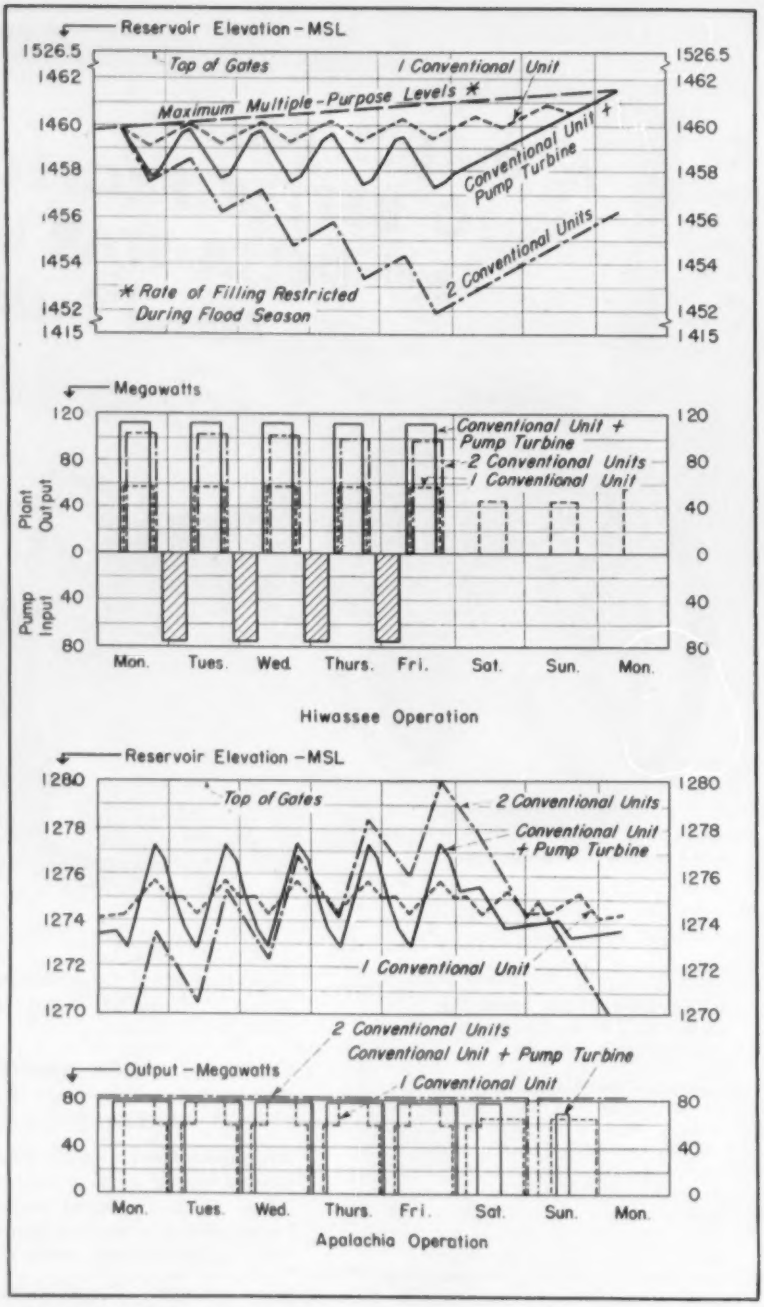
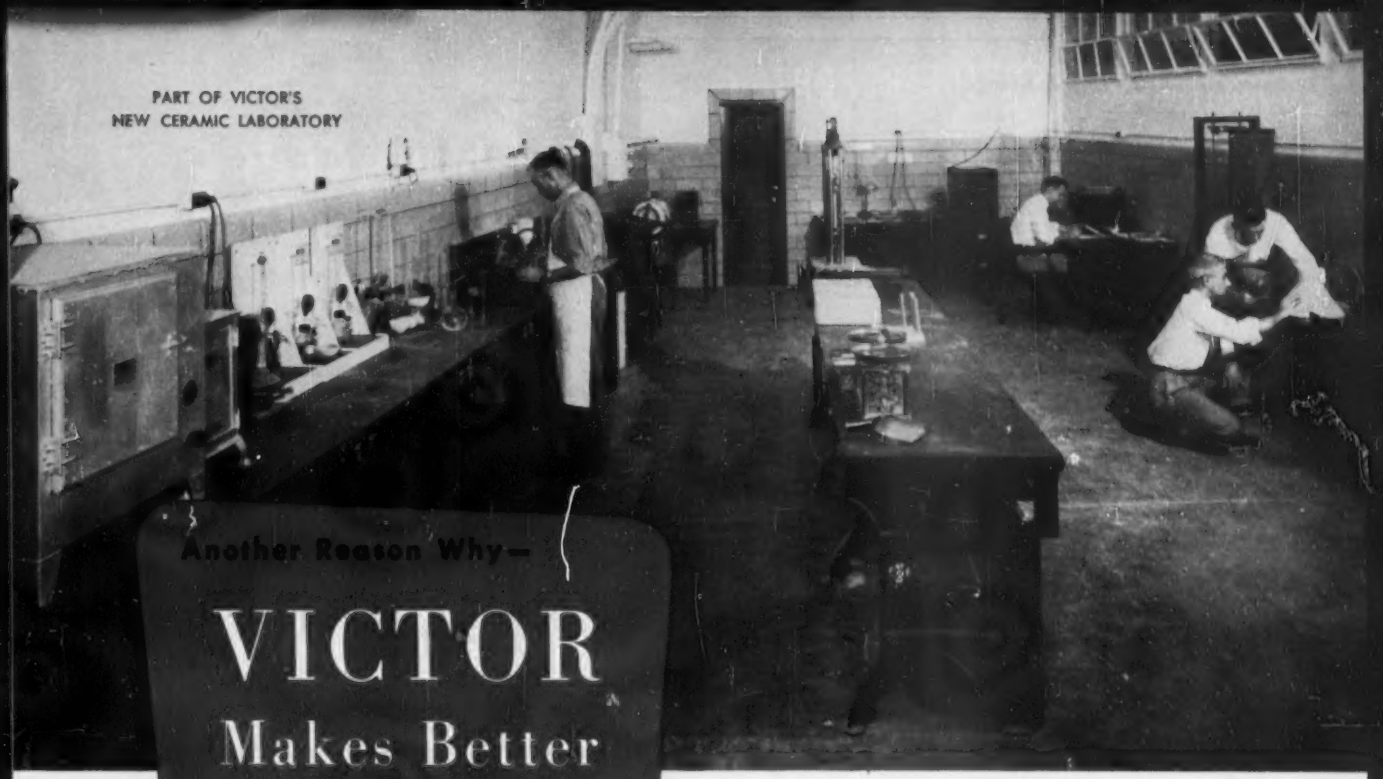


FIG 5—WEEK'S OPERATION during filling period at Hiwassee and Apalachia which forms the pool below Hiwassee, indicates maximum capacity can be obtained with the pump-turbine unit

Injection valves will be located at upstream and downstream ends of the penstock, the first for the turbine tests and the latter for testing the unit as a pump.

During the turbine test, salt velocity curves will be made at the upstream injection valve as well as at the two electrodes in the straight run of the penstock. The taps will be calibrated for future measurement of discharge while the unit is generating. Another set of taps, at either end of the tapering section adjacent to the scroll case entrance, will be calibrated for use during the pumping cycle.

Construction work at Hiwassee was started March 1, and the unit is scheduled to go on-the-line sometime in October 1955.



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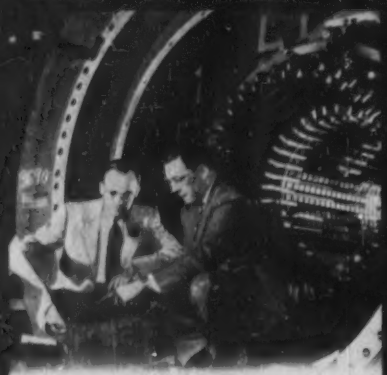
PROJECT SERVICE REPORT

Planning and co-ordination help CEPCO save time, money on new steam plant

1 One-line diagram is discussed by W. Fleming, Exec. Ass't. CEPCO; C. Holland, G-E Sales Engr.; and C. Ernst, V. P. and Gen. Mgr. CEPCO to start project.

2 Final drawings reviewed by H. Soliday, E.E., Fluor Corp.; W. Moody, G-E Applic. Engr. and O. Hedrich, Power Consultant and Proj. Mgr., Fluor Corp.

3 Detailed specifications are approved by W. Fleming, Exec. Ass't. CEPCO; R. R. Owen, G-E co-ordinator at Schenectady and G. Miller, G-E Sponsor Engr.



4 Connection details are worked out for first 30,000-kw generator by W. Marsh, G-E Project Engr. and J. M. Todd, G-E Generator Engr.

5 Schedule and shipment progress reports compiled by L. Warner and E. Clifford of G-E Order Service keep customer consistently up-to-date on all apparatus.

6 Plant in service, President of CEPCO, Albert Cage, gives his enthusiastic approval to the successful "ahead of schedule" completion of Highgrove.

On the line—This dramatic floodlighted night view outlines the 320,000 lb. per hr. boilers, the turbine generators and one of the two-pass side entry condensers. The two 30,000-kw units can be operated by a crew of only four men per shift.

Teamwork Helps Get Highgrove On The Line—Ahead of Schedule

The first completely outdoor steam plant to be built on the Pacific Coast, the Highgrove plant of California Electric Power Co., near Riverside, was completed ahead of schedule at an overall cost of approximately $140 per kw. G.E. was given unit responsibility for all the major electrical equipment of this base load station.

The success of this project was the result of careful planning on the part of the electric utility, the Fluor Corporation, Ltd., Engineers and Constructors . . . plus the teamwork of General Electric "Project Service."

What is G-E Project Service?

Under Project Service, a G-E team of sales and application engineers and expediters is assigned to co-ordinate the manufacture and delivery of all the electrical equipment—or any of the major components you call on G-E to supply—whether purchased directly, through your consulting engineer, or machinery manufacturer.

From preliminary one-line diagrams through final delivery, every major step is carefully engineered, scheduled, followed-up and its progress reported to you. The overall objective is to save you time, money, and engineering manpower and at the same time secure complete electrical and mechanical co-ordination.

Cuts engineering, installation time

It will relieve you and your consulting engineer of many details of electrical specifications, design and manufacturing co-ordination and delivery schedules. Project Service also insures co-ordination of field engineering and installation so essential in avoiding on-site errors and getting *your* plant "on the line—on schedule."

For more details on Project Service, contact your G-E Representative, or write for GEA-6032 to Apparatus Sales Div., General Electric Company, Schenectady 5, N. Y.

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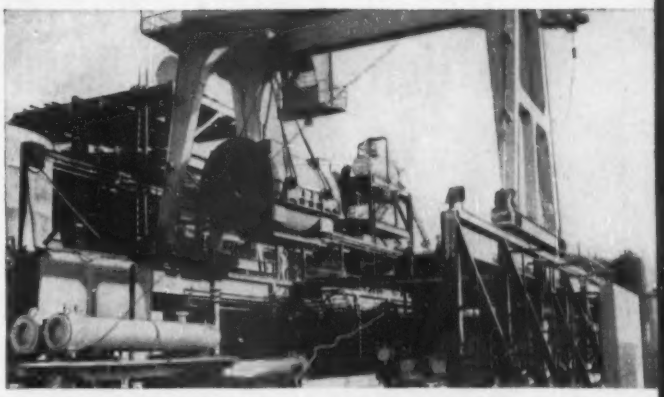
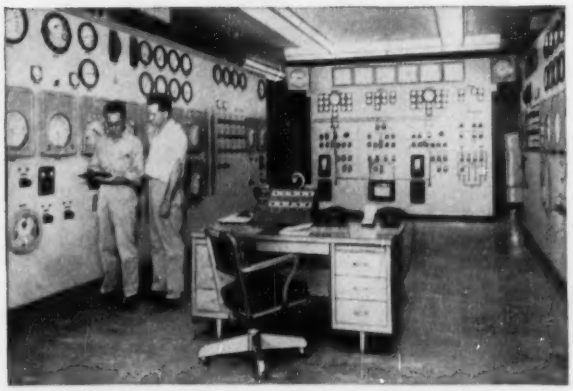
MORE POWER TO AMERICA

GENERAL ELECTRIC

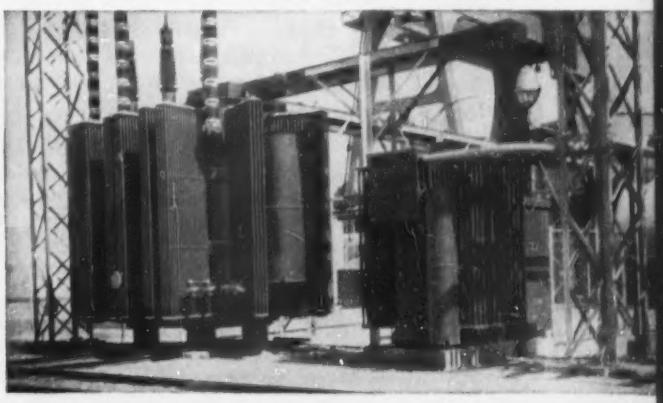


First of two 30,000-kw stators being transferred to the turbine deck from rail car. Two more 40,000-kw units will bring total plant nameplate capacity to 140,000-kw. G-E field engineers carefully check all phases of installation, assure on-the-spot supervision, unit responsibility.

G-E product specialists follow every phase of equipment selection and installation. Here turbine engineer R. B. Barton (center) inspects exciter with O. Hedrich, Fluor Corp. and Highgrove engineer A. A. Lingo.

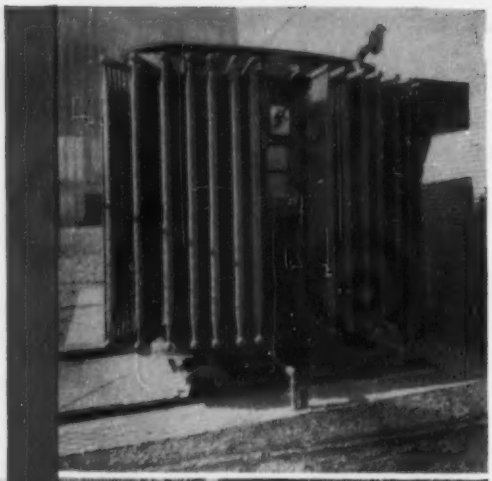


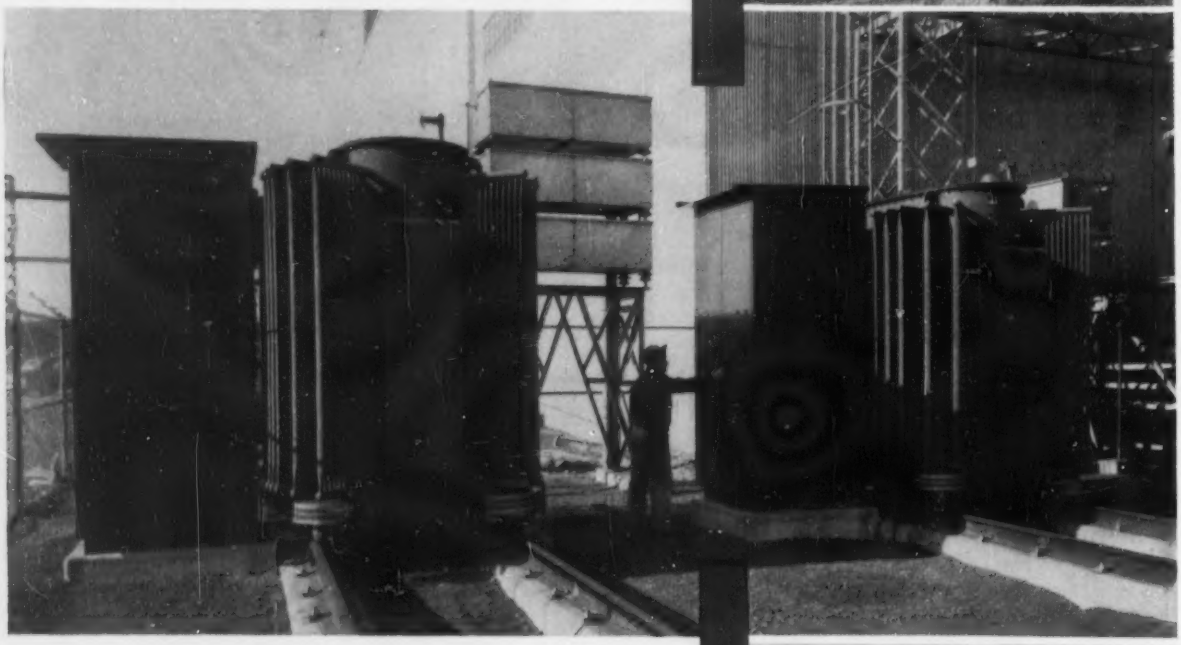
In this control room one small master control switchboard (far end of room), maintains a perfect working relationship of all equipment for the proper operation of the entire plant.

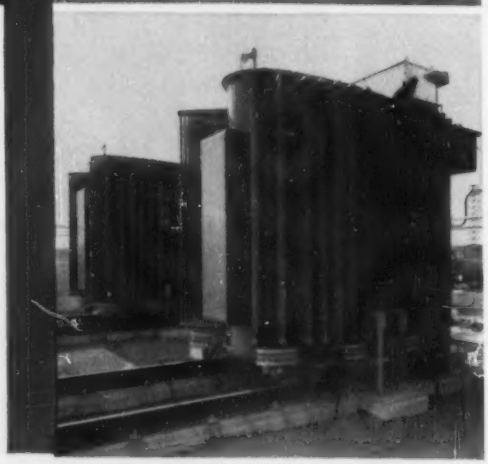


Co-ordinated engineering of project means easy installation, neat final appearance of outdoor equipment. Clean yard here has 30,000/37,500-kva power transformer and 3,000-kva station service transformer.

23 PENNSYLVANIA UNIT SUBSTATION TRANSFORMERS feed all 2400 volt lines at United States Steel's Fairless Works







19 — 2500 Kva and 4 — 3750 Kva Pennsylvania Transformers are supplying power at 2400 volts to operate open hearth furnaces, blast furnaces, hot and cold rolling mills, and coke ovens at the famous Fairless Works. Functioning as important components of I-T-E Unit Substations, these Pennsylvania Transformers assure an uninterrupted flow of power from the 13,800-volt power system to the 2400-volt distribution system.

Pennsylvania Transformer Company manufactures a complete line of power and distribution transformers, 3 Kva through 300,000 Kva, in voltages up to 330,000 volts.

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Complex Industrial Society Favorable to Engineer's Professional Progress

Presents twofold opportunity to those with 'built-in' understanding of technology to increase income and broaden service as either individual technological specialist or as manager of a component or whole enterprise

HAROLD F. SMIDDY, Vice President, General Electric Co, New York 22, N. Y.

Any electrical engineer who is competent in his own profession, has the opportunity today to multiply his income and broaden his service to our complex industrial society. Having the will to think broadly and soundly, he can accomplish this personal progress in the next five years.

Enumerated below are the circumstances propitious to an engineer's progress. This article explores these seven situations and the conclusion flowing from them cumulatively.

Science and technology shape today's industrial society. The scientific and engineering developments, along with the power over materials and equipment these bring, require the type of creative thinking that engineers can apply to keeping social progress and human relations abreast of technical progress. Along with technical knowledge, the engineer's professional attitude is a root requirement.

"As every engineer knows, a culture dependent on power-driven machinery has its own postulates," Col Lyndall Urwick told an ASME session at the Chicago Centennial of Engineering in September, 1952. "Above all, the proper, the effective use of modern machinery demands of men an intricacy of cooperation, a refinement of social discipline, such as they have never before contemplated. All around us is the evidence of this truth."

Engineers with their, so to speak, "built-in" understanding of the obligations involved in bringing a truly professional approach to the day's work, have a distinct edge over the other professions. They have this edge whether they elect to follow a managerial or a technical path. Understanding technology, they also appreciate the service spirit. Consequently, the engineer has a double opportunity for personal progress and its rewards.

Technical Careers . . . There are no visible limits to the opportunities afforded the engineer choosing to work as a creative technical engineer. He works in an era described as that in which more technological progress has been made than in the previous 5,000 years. The past 50 years have witnessed an unpredictable increase in the use of power and communications. The engineer has even taken over production in such a basic economic area as the farm, where the tractor, the hay drier, the separator, and the milking machine are the palpable evidence of his continuing creative thinking.

"Look at the marvels of America today, analyze them, and you will find that engineering is the basis of

Factors Easing the Engineer's Progress

1. Advancing science and technology comprise a major factor fixing the nature of our society and the problems of organizing and managing its constitutent institutions today.

2. The impact of scientific and engineering developments, and of the power over materials and equipment which they bring, requires corresponding creative thought and effort to keep social progress and human relations abreast of technical progress.

3. The necessity of organizing and managing the business and other basic institutions of an increasingly mechanized civilization calls for the peculiar kind of skills engineers, especially electrical engineers, possess.

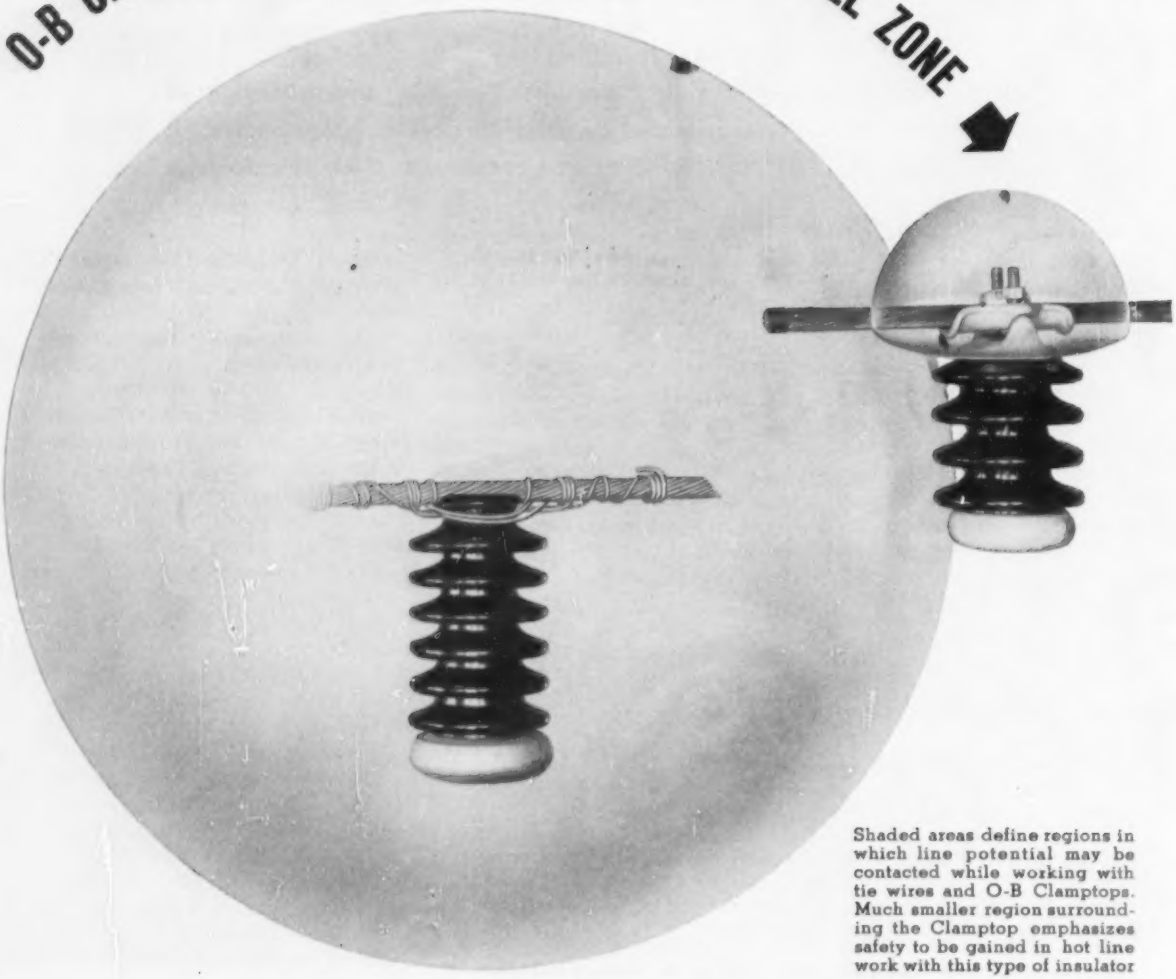
4. The electrical engineer who is alive to these potentialities has a choice of two equally challenging fields of service in which to realize his own potentialities, either better individual creative performance in the field of electrical engineering as such or direct participation in management in which results are achieved by leadership in planning, organizing, integrating, and measuring the activities and performance of fellow workers, rather than through personal productive output as such.

5. The needs, challenges, and rewards for contributions to better technical electrical engineering effort are especially clear at this time.

6. The electrical engineer has special qualifications for transferring from technical to managerial work.

7. Any competent electrical engineer can increase his income very greatly if he moves intelligently and sincerely in that direction.

O-B CLAMPTOPS CONFINE HOT WORK TO SMALL ZONE



Shaded areas define regions in which line potential may be contacted while working with tie wires and O-B Clamptops. Much smaller region surrounding the Clamptop emphasizes safety to be gained in hot line work with this type of insulator

O-B Clamptops cut down the hazard zone surrounding an insulator being worked hot. Line potential can be contacted in this zone, and opportunities for accident vary with the size of the hazardous region. Of course, there's a big safety advantage in keeping it as small as possible. O-B Clamptops, both in principle and design, hold the region at line potential to the smallest possible limits.

To point up the difference between safety values using Clamptops or tie wires, see the illustration here defining the regions through which tie wires or the energized tips of hot sticks might pass while in use.

Thus O-B Clamptops make a worthwhile contribution to safety in hot line work in three ways:

1. Reduced danger area
2. Improved hot line working methods
3. Improved attitude toward hot line work

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Ohio Brass

MANSFIELD OHIO, U.S.A.

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Story starts on page 25

practically all of them," A. C. Monteith, vice-president of Westinghouse, told an AIEE meeting in 1951. He went on to point out that: "The new automobile, television wonders, buildings, roads—all are engineering accomplishments. What will develop out of atomic energy will be dependent on what engineers can do with it.

"Look at the last war with its airplanes, tanks, radar, superguns, bombs. All were engineering achievements, and war in the future would be even more a matching of engineering skill. Our greatest problem today is to make the public understand the need for superior engineering and for engineers."

Prospect . . . Science, in addition to producing a mechanical revolution, has produced what is essentially a biological revolution. Its contributions to human longevity have raised the certain expectation of 50 to 70 million people being added to the population of the United States in the next 50 years.

Such an expansion of population has implicit in it the expansion of the nation's economy to meet the requirements of such a population and an immense need for better engineering performance. Here is a wide-open opportunity for more engineers, and the rewards for their services will be commensurate with their creative approach to it.

Opportunity in Management . . . Management is essentially leadership through planning, organizing, integrating, and measuring in the use of available human and material resources of an enterprise. Its function is to achieve chosen optimum objectives well, economically, profitably, and on time.

Management involves the exercise of responsibility, with commensurate authority to make decisions, take action, or recommend the decisions or actions of others as means to achieving those optimum results. Engineers, because of their "built-in" professional attitude, their trained understanding of technology and its implications, have a preferred status in competing for the expanding and ever more complex jobs for which managerial talent is sought on all sides.

One measure of the engineer's opportunity in the managerial field is the current shortage of able managers. This shortage has stimulated the manager development programs which are receiving spectacular publicity through all sorts of business media. What is especially important to the purposes of this article is the current definite shortage of managers of specific engineering departments and components. The need for general managers is almost as great.

Two-Way Cooperation . . . The work of the individual engineer and of his manager in an industrial organization is like the functioning of the heart and lungs in the human body. When the work of either component falls short of what is expected of it, the organization fails to operate correctly and harmoniously. Without complete two-way communication and cooperation between the functional specialist and his manager, the organization cannot function effectively and competitively.

Mutuality of interests extends beyond the individual plant and today is essential between all elements of our complex technical society. This point is made cogently by Peter Drucker in his "The New Society—The Anatomy of Industrial Order."

"The demands of the enterprise on the plant community and the demands of society and of the individual are in harmony," he wrote. "The enterprise must demand that the individual assume a managerial attitude toward his job, his work, and his product, but that amounts to the same thing as society's demand for the individual's responsible participation as a citizen.

"The enterprise must demand the fullest utilization of the abilities and ambitions of its employees; its demand for people to fill supervisory and executive positions is practically insatiable, which means that the enterprise's interest and the demand for equal opportunities run parallel."

Industrial Integration . . . Pointing out that the managerial attitude is most important to the new industrial middle class of supervisors, the technicians, and middle managers, Drucker continues:

"If the efficiency of the enterprise depends on the attitude of the production workers, the very strength and functioning of the enterprise may well depend on the attainment of a managerial attitude by the middle groups. For these groups are the organization itself, the nerve and circulatory systems of the enterprise.

"Unlike their ancestors, the skilled artisans, supervision, middle management, and technicians need no skill in the handling of tools or of materials. Their skill is the ability to integrate. They have to organize the men under them into a productive team. They have to apply technical and scientific knowledge to the product and processes. They have to fit the work of their departments into the work of the whole and to project the whole onto their own work. Top management can set the pattern, but middle management and supervision must live it.

"During the last few years American management has begun to realize the importance to the enterprise of this middle group and its attitude. But so far very few managements understand that of all the groups, the industrial middle class finds it hardest to see the whole and to understand its own function.

"The production worker deals at least with something tangible and immediate: a process, a motion, a product. He handles a strip of metal, pushes a lever, operates a machine. The middle group handles blueprints, pushes paper forms, and manipulates concepts and figures—all highly abstract."

Dual Opportunity . . . In the light of Drucker's writing, any move resulting in separation of engineers as a unit from the enterprise and its management would seem to have dangerous potentialities. The need for unity among engineers and other participants in an organization as complex as a corporate enterprise is clear.

Thus one possible field for engineers' consideration, a field where some pioneering is yet to be done, is in finding how best to integrate the efforts of the engineer with those of the manager and, indeed, with all other employees. Such unity equips modern industrial corporations to serve society properly.

A thrilling dual opportunity and challenge are offered to professional, technical engineers in our complex industrial society today. The engineer can elect either the path of the creative, individual engineer, of that of the manager of engineering work or the other business functions or of the enterprise as a whole.

Which Regulator is best?

ORIGINATORS OF 5/8% STEP REGULATION

this Utility compared them

ALLIS-CHALMERS
5/8% STEP VOLTAGE REGULATORS

A large eastern utility untanked and examined all three of the leading makes of voltage regulators. They called in engineers, purchasing people, operating and maintenance men . . . everybody who works on or with regulators. Designs were analyzed, construction checked, operation observed. Result: Allis-Chalmers distribution regulators came out on top.

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You can examine an Allis-Chalmers distribution regulator completely free of charge. Allis-Chalmers will ship any recognized distribution system a Type JFR distribution regulator for thirty days of testing. Get complete information — or a test regulator — by calling your nearest A-C office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin. Allis-Chalmers will also send you a copy of the new "regulator check list" to help you analyze all regulators.

Check these Advantages

***Quick-Break* Mechanism:** fast, efficient tap changing. Long wear made possible by "tool engineer's quality" and precision construction methods. Laboratory tests have proved this mechanism can withstand 5 million operations.

Long-Life Contacts: Large size, made of arc-resisting materials. Will they stand up? Utilities report over 10 years' operation with *no appreciable signs of wear.*

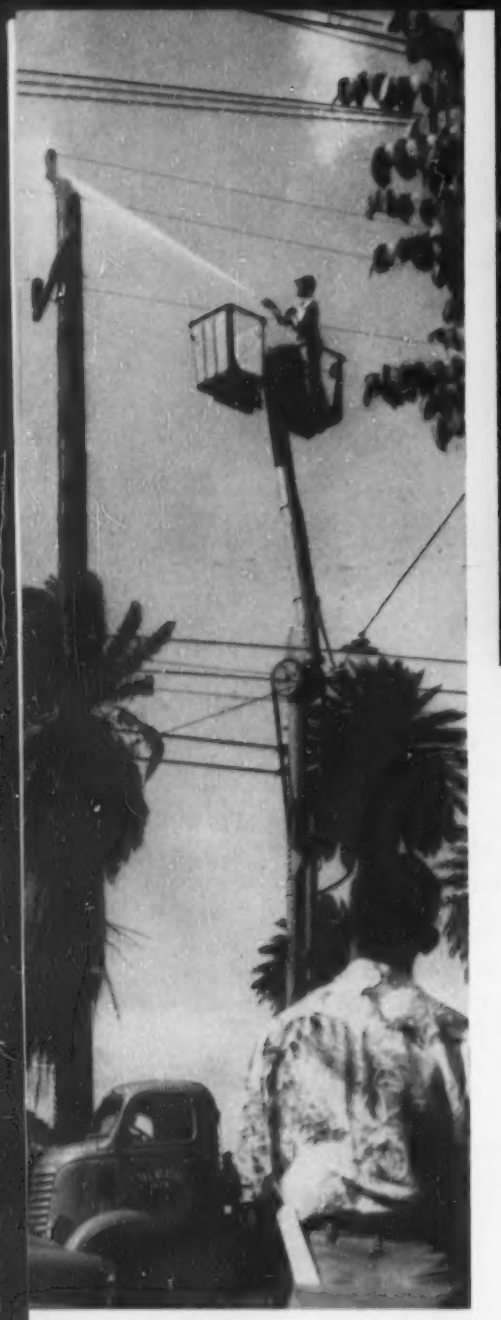
***Feather-Touch* Control:** You get a ± 1 volt band, Class I accuracy. Floating beam of regulating relay means friction can never upset accuracy because no mechanical bearings are needed.

Unit Construction: Simplifies inspection. You can untank a unit simply by disconnecting the position indicator and removing a few cover bolts. Then hoist up on the cover-lifting eyes — complete unit comes up into plain view.

A-4357

ALLIS-CHALMERS

A-C ALLIS-CHALMERS



HAWAII'S SALT AIR puts a deposit on insulators that has to be washed off. Power is not shut off; workman stands on insulated platform, uses special tools.

On the Cover

Aloha now comes televised on Oahu. Since December 1952 TV has been added to the services supplied by power in the islands. Territory now has three television, 13 AM and 2 FM stations. Hawaiian Electric not only supplies some stations, it also supplies some music, sponsoring Honolulu Symphony Orchestra Concerts.

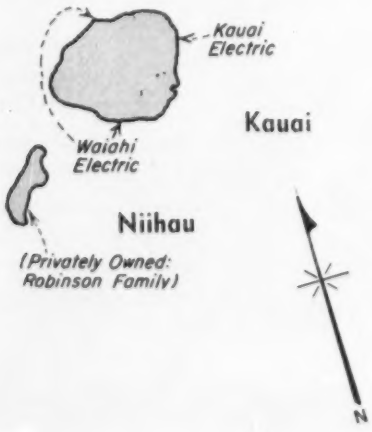
Brilliantly lighted, downtown Honolulu

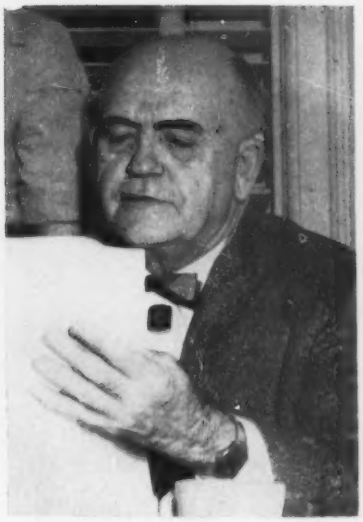
Island Tradition Is Making

Workmen this month are raising a mighty clatter around the offices of Hawaiian Electric Co in mid-town Honolulu. Their mission: Install an air conditioning unit.

Ten years ago it would have been heresy to suggest that such a thing was needed anywhere in the Hawaiian Islands, the advertised "Paradise of the Pacific" where the temperature really does average in the 70's every month of the year.

That it isn't heresy today is partly because of aggressive





PRESIDENTS of Territory's two biggest power companies are William (Doc) Hill, left, of Hilo Electric Co, and Leslie Hick, Hawaiian Electric

gives evidence that...

a Place for Power Progress in Hawaii

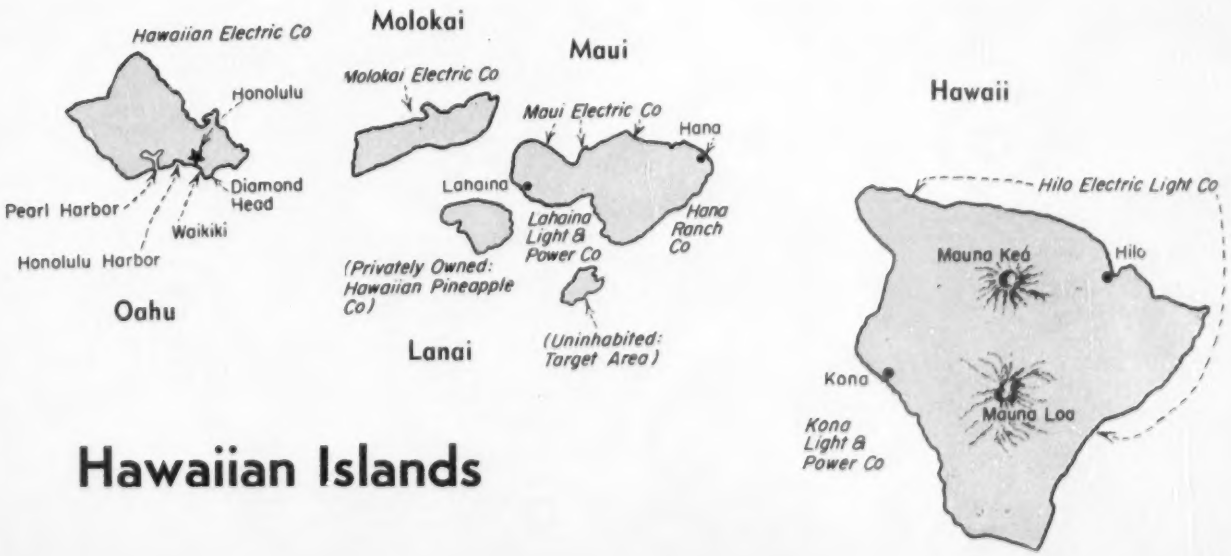
salesmanship Hawaiian Electric Co has fostered since it started in business in 1891, while the Islands were still a monarchy.

Relatively early, HECO found itself vigorously driving its own ice-house into oblivion by pushing electric refrigerators.

Ever since then it has been selling hard to push up power loads via expanding its island's business, electrical cooking schools, deep freezer schools for housewives and also the recent air conditioning promotion.

HECO kept charts for ten years to show that—though Hawaii's temperatures do average in the 70's year-round—most working days find the mercury-humidity factors pushing several notches above the point considered optimum.

After a look at these charts, several years ago, Sears, Roebuck and Co ordered air conditioning built into its big new Honolulu store and just about every important building since then has followed suit.



Hawaiian Islands

MONKEYPOD TREE Mark Twain planted was lighted last Christmas as Hilo Electric reached Waiohino

HECO on Honolulu's skyline: Right, main office building (Aloha Tower is seen behind it); center, No. 1 Plant; left, new waterfront plant

POLE IS SWUNG into place over difficult terrain as HECO extends service to suburban Wailupe, Oahu

WORKMEN had to lug material by hand on the Wailupe job, which stretched power lines across the island's 3,400-ft Koolau Mountains

HECO had little choice but to spruce up its own air conditioning this year—adding its bit to the upward trend that saw Honolulu residential consumers use an average of 3,242 kwhr each in 1953 against a national average of 2,345 kwhr.

In ten years, 1943 to 1953, HECO's gross utility revenues more than doubled, climbing from $7,228,000 to $15,035,000.

This is a reflection of its own hard-selling effort (a 1,026-unit housing subdivision built last year installed all-electric homes) plus the growth of the community, which ranks as one of the wealthier ones in the U. S.

What's Good for Hawaii . . . HECO's policy is committed to the principle that its own best interests are the best interests and growth of Hawaii. Much of its effort as well as its institutional advertising has been aimed in this direction—pointing out and encouraging new industries for the islands, drafting architectural day-dreams of what the Honolulu of the future could be like.

Although Hawaiian Electric is the biggest electrical utility in the islands, it is far from being the only one.

Territory of Hawaii includes seven major populated islands. Two are privately owned, but the other five have nine electrical utilities serving them.

HECO is the giant, putting out 88% of the total power sold, but its fellow utilities find themselves on the same path of growth and expansion. The territory now has 500,000 inhabitants.

Here are the figures on the size of territorial utility operation in 1953 as compiled by the Public Utilities Commission of Hawaii:

	No. of Customers, Year-End	Kwhr Sold (000)	Total Electrical Revenues
Island of Oahu			
Hawaiian Electric Co	86,593	699,439	$15,035,088
Island of Hawaii			
Hilo Electric Light Co	15,804	47,445	$1,887,668
Kona Light & Power Co	2,387	2,499	$200,547
Island of Maui			
Maui Electric Co	9,646	34,670	$1,328,011
Lahaina Light & Power Co	1,517	5,350	$155,976
Hana Ranco Co	249	611	$35,866
Island of Molokai			
Molokai Electric Co	1,267	7,533	$331,985
Island of Kauai			
Kauai Electric Co	4,806	12,017	$504,098
Waiahi Electric Co	3,654	11,275	$452,408
TOTALS	125,923	820,842	$19,931,652

In addition to these plants, many sugar and pineapple plantations have power plants of their own.

The U. S. Navy has its own power plant at Pearl Harbor on Oahu, but also buys from Hawaiian Electric.

Hawaiian Pineapple Co has its own utility on its wholly owned pineapple plantation island, Lanai.

Niihau, the only other populated island (200 people live there), is used by a private family for ranching. It is cut off from the rest of the Territory by restrictions against visitors, kept much like primitive old Hawaii and is without electricity.

The large number of electrical utilities is a natural by-product of the insular geography of Hawaii and also of the historical beginnings of the industry. Power was first used to supply irrigation systems and mills at more than 40 sugar and pineapple plantations.

(*Continued on page* 37)

New "Coastal Finish" touch-up

"sprays" away transformer nicks—scratches

Nicks or scratches that occur in handling transformers can be easily and quickly sprayed away when you use the handy new Westinghouse "Coastal Finish" Touch Up. No messy brushes—no awkward buckets. Just press the button!

As you know, exclusive Westinghouse transformer "Coastal Finish" is the best laboratory and field tested answer to rust and corrosion—under any weather or atmospheric conditions.

Now, the finish coat of the "Coastal Finish" system is available in handy 12-ounce pressurized cans for convenient application . . . anywhere. Full directions for use appear on the label.

For complete information on Westinghouse "Coastal Finish" Touch Up call your nearby Westinghouse representative. Or—if you prefer—write to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. You will get prompt attention.

J-70716

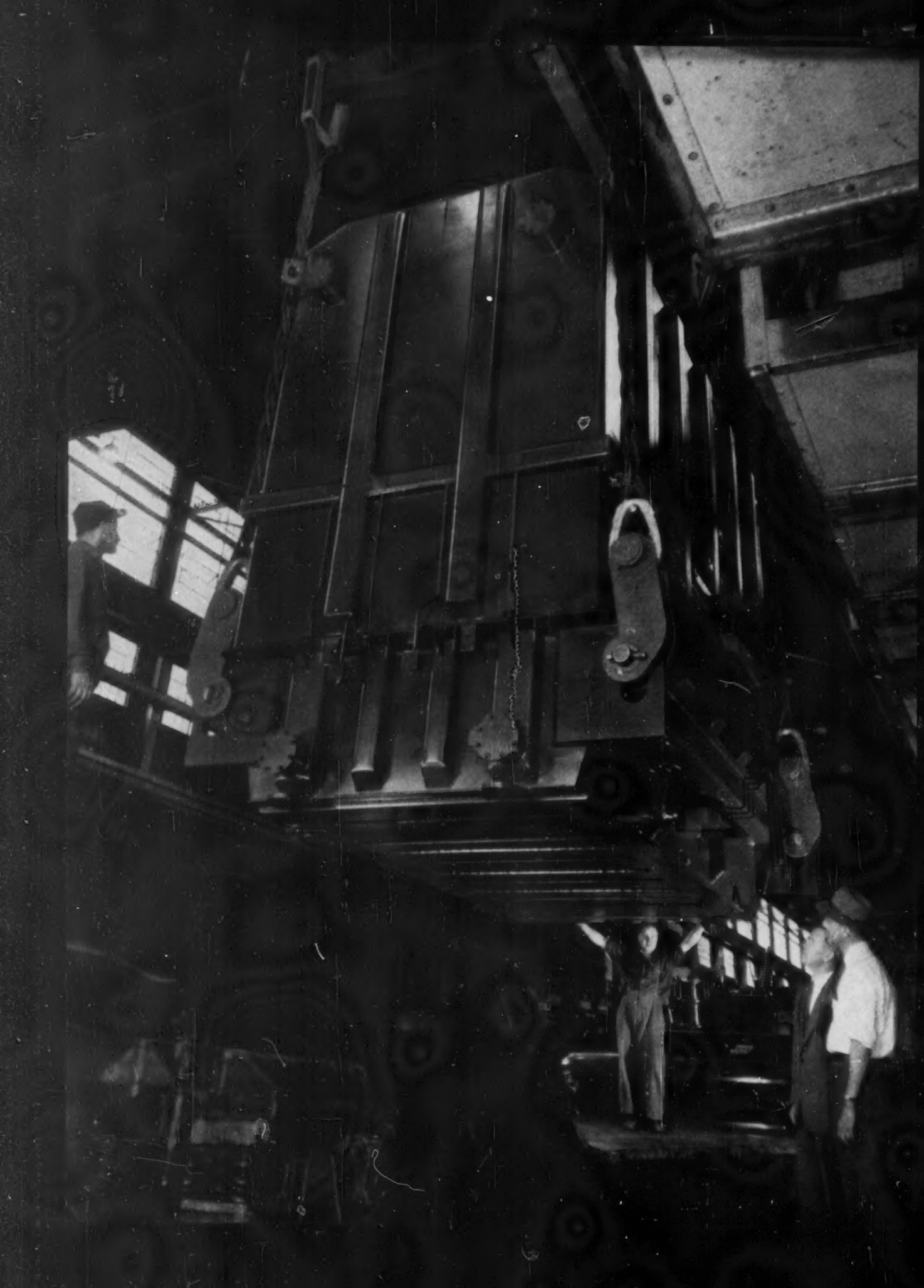
YOU CAN BE SURE...IF IT'S Westinghouse

USE "COASTAL FINISH" TOUCH-UP

NO BRUSHES—NO BUCKETS

ON THE POLE

ON THE GROUND



Helping the industry meet its growing loads

Setting transformer capacity records within practical size limits

The 220,000-kva Westinghouse Form-Fit Power Transformer, shown at left, is, by far, the highest rated unit built to date. Even so, its compact rugged construction permits upright shipment . . . in a single factory-assembled, sealed and tested unit.

Facing the problem of ever-increasing capacity required . . . versus transportation and handling facilities available . . . has been a Westinghouse specialty for years. Form-Fit construction has consistently provided the solution to this problem . . . setting new records in transformer capacity within practical size limits.

Even now, units of 315,000 kva are being built. These, too, will be shipped upright.

Form-Fit construction inherently provides the greatest mechanical, thermal and dielectric margins, thereby assuring the highest quality in the smallest package. This creative engineering has pointed the way to substantial reductions in installation and operating costs for the industry. Research continues with the promise of even greater economies.

Utility management can thus be assured that their increasing load requirements will be met with transformers designed to meet their specific needs with maximum reliability and economy. The adjoining column provides additional facts relating to Westinghouse Form-Fit Transformers. J-97180

YOU CAN BE SURE...IF IT'S
Westinghouse

More kva per pound . . . a Westinghouse achievement

Shown below is a 190,000-kva power transformer shipped upright and intact in 1953. At that time it also led the industry in maximum rating. This is additional, tangible evidence of Westinghouse skill in packing more kva into practical size and weight.

Hipersil®—vital contributor to more kva per pound

Hipersil is a grain-oriented silicon steel introduced by Westinghouse in 1935. This highly permeable material has a distinct advantage over conventional steels in loss characteristics. As a result transformer performance has been considerably improved —over-all size and weight reduced.

Next in line—315,000 kva

In process of manufacture at the Westinghouse Transformer Division, Sharon, Pa., is a 315,000-kva unit which will again be the first of its rating to be shipped intact. This new giant would not have been possible had it not been for many transformer developments which permitted the rapid increase in size of ratings, depicted on the chart below. All were Westinghouse "firsts" for the industry.

For more information on Westinghouse Transformers call your nearby Westinghouse Representative or write direct to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

"GOABS® are the linemen's choice for easy installation, simple operation, and safe maintenance"

Says: L. R. (Les) Crane, Manager of Sales,
Switching Equipment, A. B. Chance Company

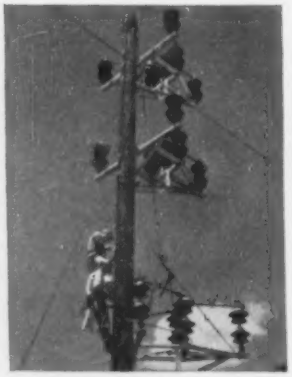
These gang-operated air break switches have won favor everywhere. Linemen call them "the linemen's switch" because of their easy and safe installation and maintenance, and management likes them because they afford substantial savings on right-of-way costs, installation costs and maintenance costs (complete steel mounting of switches and controls)—and because they are dependable, efficient, and safe for breaking charging currents.

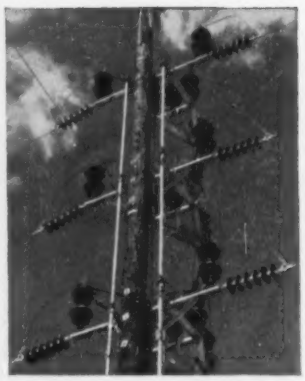
Users of GOABS report savings of at least 25% in installed costs over conventional air break switches.

You can get GOABS for 2-way or 3-way switching in 600 amperes, 15, 23, 34.5, 46 and 69 KV ratings. Bulletin 601-A gives complete information. Write for your copy today.

This miniature 2-Way GOABS installation shows the 180° free climbing space that means safe maintenance to linemen.

Here's what linemen like about GOABS





GOABS are easy to install because each complete phase of the switch is pulled up as a unit and bolted to the pole. No assembly is necessary on the pole. Mounting the switches on a single pole eliminates so many extra operations that expensive line crew time for installation is reduced to one fourth of what is normally required for multi-pole structures. The photographs of the 3-Way GOABS at right clearly illustrates the 180° free climbing space that assures safe and easy maintenance.

CS54-18

® Formerly Matthews GOABS

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MISSOURI • SAN FRANCISCO, CALIFORNIA

TREE LIGHTING at Christmastime is the same in Hawaii as it is elsewhere in the U. S. HECO's load is heaviest just before Christmas

HAWAII: *Story starts on page 30*

Won a Gamble . . . In 1891 by virtue of having dared to gamble on erecting the needed plant before it got the contract, Hawaiian Electric Co came into being, was enfranchised by the monarchy, continued after U. S. annexation in 1898, and has been providing Honolulu with power ever since.

Since World War II the trend has been to consolidation. Kauai Electric Co in 1950 absorbed six other firms, consolidated them and interconnected lines in one of the biggest of such mergers.

Hilo Electric Light Co just last year expanded its lines into two areas previously served by sugar plantations south of Hilo. This year it is moving north to absorb other lines.

Hilo Electric solved a problem in a novel way in 1947. Beset by a power shortage, its officers read that the tanker Fort Dearborn had broken apart in stormy seas several hundred miles from Hawaii. They had an idea.

They bought the salvaged stern section for $300,000, floated it into Hilo harbor, and soon had it hooked up to add 4,800 kw to Hilo's system.

In 1951, they moved the equipment ashore, changed the main turbine unit from a block-load type to a utility-station type with a steam chest and governor. The change raised output to 6,000 kw.

The Hawaii electrical utilities get their power in a variety of ways, most of them more conventional.

Hawaiian Electric has two steam generating plants with a capacity of about 220,000 kw. It's now engaged in a $22 million four-year plant expansion program, started in 1952, which will add 50,000 kw in a new plant and extend transmission lines.

Present property of HECO is valued at about $57 million.

HECO uses residual oil to fire its steam generators, while the other Hawaii utilities with steam plants use Bunker C fuel oil.

The Molokai, Kona and Hana plants, however, are entirely diesel. Waiahi and Hilo both have part diesel operation.

Not Much Water . . . Hydro plants are in use at Hilo. Hydro supplies two utilities on the island of Kauai, Waiahi Electric and Kauai Electric. Maui Electric uses a tiny (60 kw) automatic hydro plant to serve one isolated coastal area.

Three of the companies—Kauai, Waiahi and Lahaina—are principally owned by sugar plantations and are distribution utilities only. They buy their power from the plantation generating plants.

Hana Ranch Co maintains its utility as a service to a small, isolated area in the southern part of the island of Maui.

The Hilo and Maui companies both are growing, along with Hawaiian Electric. Hilo is adding 2,000 customers in the Kohala area this year by taking over the power system of Kohala Sugar Co. Last year, it added 35 miles of lines to pick up two sugar plantation areas near Kilauea Volcano. In the process, it also gave the town of Waiohinu its first lights at Christmas last year and lighted a giant monkeypod tree Mark Twain had planted there in 1886.

Maui Electric has more than doubled its capacity by adding a 11,500 kw capacity power plant this year to the two 5,000 kw units it previously had in operation.

One advantage the island utilities seem to have over their mainland counterparts is that load demands remain fairly constant year-round so that a much better load factor can be obtained. Just as in other parts of the United States, in Hawaii expansion is the keynote.

HYDRO POWER is not much used in Hawaii. Among the few stations is this one on the Wailuku River, Hawaii, run by the Hilo Electric Co

AIEE Summer Meeting (*Continued from page 15*)

CONGRATULATIONS are extended to R. W. Sorenson (left), new honorary member, and F. A. Cowan (right), recipient of 1953 Lamme Medal, by Pres Robertson at the AIEE meeting

Speaking in the same vein, AIEE President Robertson pointed out that the matter of engineering unity is a complex problem. But it is the work of the individual engineer, rather than the existence of the organization, that will bring professional standing, he said. He called attention to the fact that professional standards of the medical profession are high, are well-known, and are upheld.

Need Standards . . . Engineers must have standards of attainment devoted to the public welfare, he stated. They must be upheld, and just as importantly, he said, they must be publicized. Robertson asserted that the idea of unionization does not offer the best solution to engineering advancement. Under such a scheme, he said, professional status would be impossible. Professional responsibility is an individual affair, he said, and recognition must start at the local level. Then professional recognition can advance to state and national levels, Robertson concluded.

"He might well have been called Thomas Aladdin Edison," said George C. Tenney, vice president, McGraw-Hill Publishing Co, San Francisco, in commemorating the contributions of Edison to the entire civilized world. In his presentation, The Spark that Lit the World, Tenney noted that the first practical incandescent lamp, the phonograph, and moving pictures are only a few of the 1,150 patents credited to Edison.

Wins Medal . . . The Lamme Medal for 1953 was awarded to Frank A. Cowan, director of engineering, American Telephone & Telegraph Co, N. Y. The presentation honored Cowan for his "outstanding contributions to long distance communication and the development of modulating and transmission measuring apparatus of original design and wide application."

Dr R. W. Sorenson, California institute of Technology, Pasadena, received a certificate of honorary membership in AIEE.

(Story on AIEE's new officers appears on page 47.)

Index Is Available

Electrical World's semi-annual index for January-June 1954 has been prepared, and copies are now available upon request. They may be obtained without charge. Address requests to Electrical World, Editorial Office, 330 W. 42nd St., New York 36, N. Y.

'Quantum Jump' . . .

. . . is the name given to atomic process claimed to increase usable power from coal.

A process which an Army officer who developed it claims will increase by 8,000 times the usable power from coal, petroleum and other carbonaceous fuels is undergoing evaluation by government researchers.

The process, said to be based on an atomic reaction, has piqued the interest of technical brass in the Pentagon, but so far has met skeptical reception from men working closely with fuels and development of atomic energy.

The inventor plans to build a 100-lb apparatus in which coal would be pulverized, carried in a stream of air through an area of "atomic excitation," and from there to a boiler or other mechanism where heat and pressures produced can be harnessed.

Fissions Carbon? . . . The process, the Army officer contends, involves a type of fission that hasn't been tried before: excitation of the carbon atom, upsetting its energy balance. He claims that the new process—which he calls "quantum jump"—should provide 78,300,000 Btu's from one pound of coal. Conventional combustion releases only 10,200 Btu from the same amount of coal.

The reaction, which the inventor admits might not be easy to control, involves fission of carbon atoms. Here is where experts in the field of industrial atomic energy take their major exception.

Seven of ten highly qualified technical men consulted by Electrical World expressed grave doubts about the feasibility or practicality of the process. Only one appeared enthusiastic about its prospects. Several said flatly that it is physically impossible to fission carbon. "It sounds utterly ridiculous," one commented. Even if it were practical, said another, it would be highly uneconomical.

On the other hand, engineers from two firms manufacturing power plant equipment that would be used in such a process expressed interest in the announcement. If the inventor's claims were true, and if the process proved practicable, they pointed out, it would be a distinct step forward, since the developer claims fission products of the process are not radioactive.

25-year-old Manson tape exceeds ASTM specs

A railroad electrical engineer questioned us the other day in reference to the lasting quality of our Okonite and Manson Tapes. This recalled a letter we received a few years back

from a man who had bought a roll of Manson tape 25 years before. His letter said:

"There is not much left on this roll of Manson tape, but I have been pulling a little off this roll for 25 years... I have the original tin box and always keep the tape in it and the little bit that is left is still good." And he enclosed what was left of the tape.

We couldn't make all the ASTM tests because of the small amount left. But we made a tensile strength test and found that the sample tested about *25% above* the ASTM minimum. ***It also withstood the ASTM dielectric strength test of 1000 volts without breakdown.***

There are lots of case histories like this in our files. Remember, when you specify tape, you really want protection for the weakest part of the cable. Your best security is in the best tape.

Economy in tape is a long-range proposition. Okonite and Manson tapes will keep the splice tight and waterproof longer than ordinary tapes and consequently will help cut down high maintenance costs. It's "spliced for life" when you use Okonite premium quality tapes.

Why not send for a set of instruction sheets, EW-5678, you'll find them helpful.

...when you splice with:

AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS ONLY

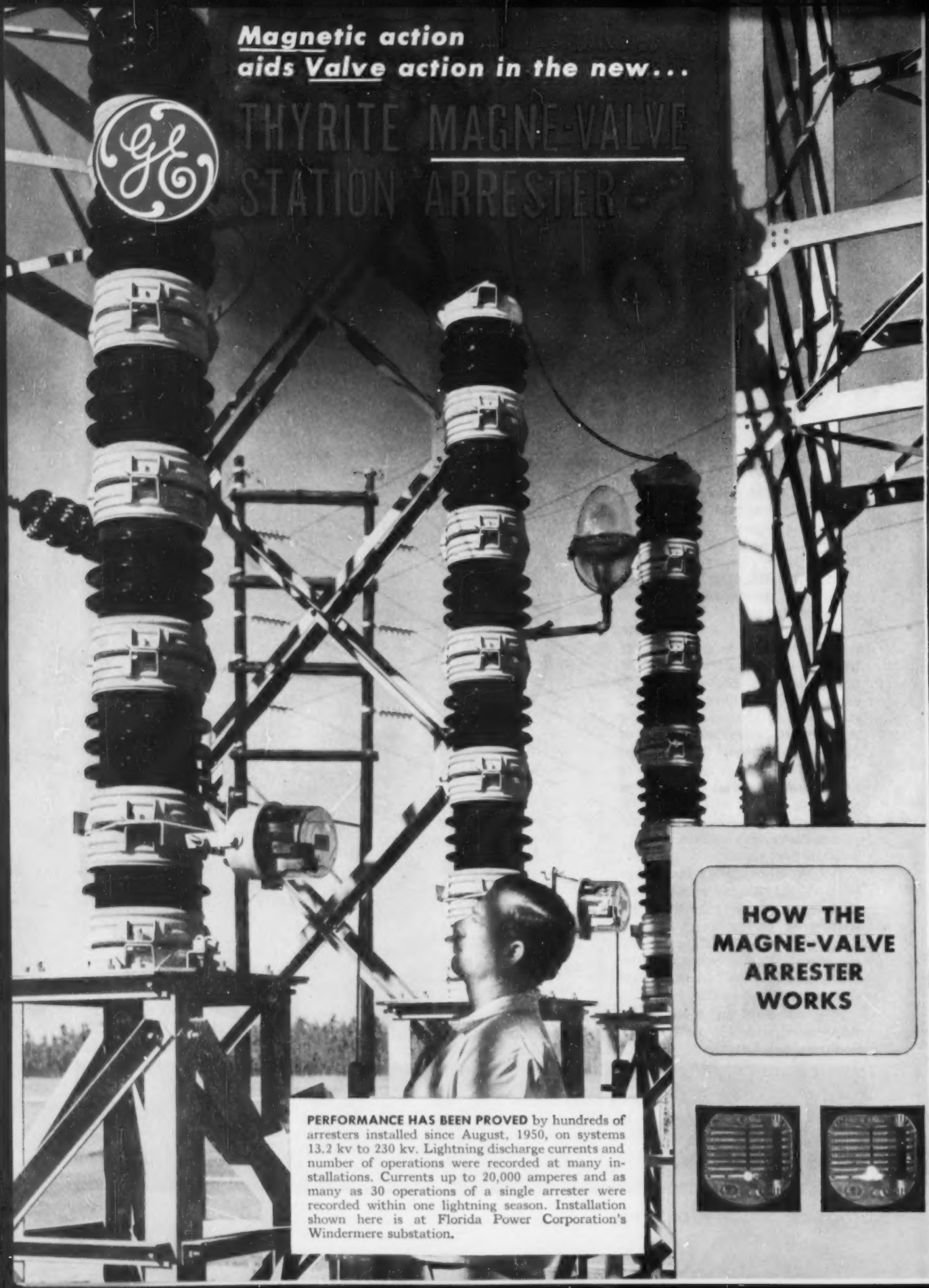
1434

Made by
THE OKONITE COMPANY
PASSAIC NEW JERSEY
SINCE 1878

SPECIALISTS IN ELECTRICAL WIRES, CABLES AND SPLICING MATERIALS FOR 75 YEARS

Magnetic action
aids Valve action in the new...

THYRITE MAGNE-VALVE STATION ARRESTER



PERFORMANCE HAS BEEN PROVED by hundreds of arresters installed since August, 1950, on systems 13.2 kv to 230 kv. Lightning discharge currents and number of operations were recorded at many installations. Currents up to 20,000 amperes and as many as 30 operations of a single arrester were recorded within one lightning season. Installation shown here is at Florida Power Corporation's Windermere substation.

HOW THE MAGNE-VALVE ARRESTER WORKS

20% better protective level
3 times greater endurance

The new Thyrite* Magne-valve arrester is a major advance in reliability of co-ordinated protection of station apparatus. Let's appraise it!

FOR APPARATUS HAVING STANDARD BIL'S—

You get an unprecedented margin of protection that assures co-ordinated protection for many times higher stroke currents—even 100,000 amperes. This super-protection is especially valuable where lines or substations are not shielded or where practicable shielding may not be infallible.

You get an extra margin of protection which tends to offset adverse effects of separation between arrester and apparatus—enabling co-ordinated protection to apparatus at greater distances from the arrester.

FOR H-V APPARATUS HAVING REDUCED INSULATION—

You get as large a margin of safety in protecting 1-step reduced BIL insulation as was heretofore possible only when protecting full insulation (standard BIL). Hence, the new arrester enables a more positive approach toward reduced insulation and resulting tremendous savings in apparatus investments.

FOR DRY-TYPE TRANSFORMERS—

You get a good margin of protection—heretofore limited. Although oil- or askarel-filled transformers are distinctly preferable for connection to lines exposed to lightning, the decidedly lower impulse strength of dry-type transformers can now be better protected.

FOR APPARATUS HAVING DEPRECIATED INSULATION—

You get more positive protection—to preserve and greatly extend the operating life of old but important apparatus.

Reg. Trademark of General Electric Co.

FOR AC ROTATING MACHINES—

You get as good margin of protection to even impedance-grounded neutral rotating machines using ungrounded-neutral 100% rating arresters, as was heretofore practicable with only grounded-neutral 80% rating arrester. And for grounded-neutral machines, you can now limit the lightning stresses to 80% of the machine's 1-minute hi-pot test level. Both are important achievements for better protection of generators, synchronous condensers, and motors, alike.

FOR ALL THESE APPLICATIONS—

You get full-fledged uncompromised ***station*** arrester protection—6-inch diameter low-resistance Thyrite valve-disk with exclusive integrally fired ceramic insulating collar, the most efficient valve element ever offered.

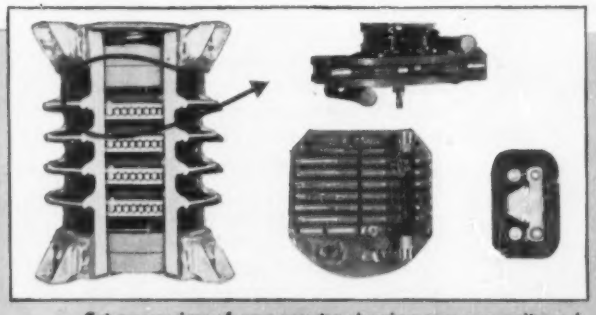
You get straight-in-line, low-resistance discharge path—28 sq. inches of cross-sectional area, with no tortuous up-and-down impedance.

You get over 3 times greater discharge capacity and thermal endurance—plenty of "guts" for withstanding high lightning currents, multiple lightning strokes, long-duration lightning discharges and severe switching surges.

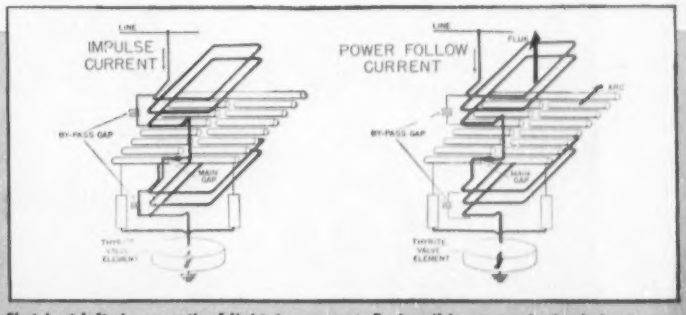
You get greater endurance now—and it protects you for future increasing discharge duty on station arresters attending trends to higher voltage lines, longer lines, greater lengths of cables, and more shunt capacitors, which increase the stored CE^2 energy in switching surges.

For more information about this new station arrester, get in touch with your nearest G-E Apparatus Sales Office or write for Bulletin GEA-1304 to Section 432-5, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC



Cut-away view of new arrester showing new gap units and their components. Gap unit (circled in red) consists of 7 pairs of adjacent gap electrodes within the field of 2 magnetic coils. One pair of electrodes constitutes main gap which controls impulse sparkover sensitivity; other pairs of electrodes form multigap path for arc-interruption of the power follow-current.



Sketch at left shows path of lightning current. Each coil has a pre-ionized shunt gap that by-passes lightning current to the discharge path shown in red. Sketch at right shows path of 60-cycle power follow-current. After lightning sparkover, the 60-cycle power follow-current flows through the coils, as shown in red, creating magnetic flux. Arrows indicate direction of magnetic flux and blowout motion of arc, which motion is the same for either polarity of the 60-cycle follow-current wave.

Film strip (from high-speed movies) shows how magnetic force sweeps power follow-current arc progressively from main gap (see extreme left) to as many as 14 multigaps in series (see second from extreme right) for efficient arc-interruption in less than a half cycle. The arc-path moves so rapidly that even hundreds of interrupting operations cause no harmful scarring or burning of gap electrodes.

THRONGS GATHERED to visit Kansas City's all-electric home. The home is to be kept on display for an indefinite period

VISITORS VIEWED TV which is set in wall above mantel and controlled from the cabinet at the end of a davenport

See—Home of Tomorrow—Today

Kansas City Power & Light Company's recently completed model home was built to promote electrical living. It is a ranch type home and contains all of the latest electrical features such as: heat pump year-round air conditioning, latest in lighting, remote-control, low-voltage wiring, adequate wiring, remote-control TV, all-electric kitchen, automatic laundry equipment.

YEAR-ROUND air conditioning with heat pump was one of promotional features. Meters at right are for study purposes. These and others will record demands and kilowatt hours used

Promotion of the new home has been unique and most effective. Advertising stressed "come to get ideas". The first Sunday, crowds were so large they did not have time to get the whole story. Ads after that stressed "come and take the free guided tour—just 25 minutes". After that people knew they could expect to be given "the works" and apparently wanted it that way.

Professional hostesses were employed to handle the showing. Sales pitch for each room was recorded and the recordings were played as the hostess at that point gestured appropriately. This prevented the wearing out of hostesses, with resulting less effective showing, as the day progressed. Recordings were high quality, made by a professional announcer and played with quality machines. This method of showing the home has been most effective.

The home was opened to employees, interested industry groups, press, radio and TV representatives the week before it was opened to the public. These groups have helped to stimulate public interest.

There have been more than 11,000 visitors to the home. There were 2,597 on the first Sunday despite bad weather. There were so many it was impossible to give them the "full treatment" as planned.

Since that time everyone has been given the complete story. Ads advised customers that it would take 25 minutes to see the home. Visitors were given the full tour even at the expense of delays and possibly some turning away. The feeling is that this practice has been worthwhile.

To Help Farmers Buy More Electrification

Rural Electrification Administration will likely step up its loans for farm house wiring, appliance and equipment purchase and other power use items as its present power use program goes into full swing.

Consideration is now being given to raising the present $1,000 limit on loans to individual farmers under this type of government financing.

Loans of this type are authorized under Section Five of the Rural Electrification Act. They are made directly to distribution cooperatives, most of which systems are already financed by the government, for reloaning to consumers.

During the past year $1,873,000 worth of Section Five loans have been approved by Rural Electrification Administration.

Largest recent loan of this type was made to the South Kentucky Rural Electric Cooperative Corp of Somerset, Ky. This $300,000 loan will enable the co-op to help members finance installation of farmstead plumbing, other electrical equipment and irrigation facilities. Some 600 rural families in the area are eligible for individual loans from this co-op fund.

The co-op has worked with local plumbers and water system dealers who have agreed on standard unit prices for installation of equipment. The agreement also provides for inspection by the co-op after installation is completed.

South Kentucky obtained its first Section Five loan in 1952. By March 20 of this year it had made 1,347 individual loans totalling $270,000. At that time, 459 loans had been repaid in full, 296 in advance of the due date. A total of $157,221.29 had been paid on the principal.

The recent $300,000 loan was an addition to previous loans to the co-op. With the water systems installed under financing of the recent loan the 600 consumer-members of the co-op will become prospects for a number of home appliances and equipment made possible by their water systems.

Another recent large Section Five loan went to Blue Ridge Electric Membership Corp of Lenoir, N. C. This $100,000 loan will permit about 500 consumer loans for these purposes:

Farmstead wiring and fixtures	$ 5,000
Farmstead plumbing and fixtures	20,000
Purchase and installation of other appliances and equipment	75,000

The North Carolina Co-op has had earlier Section Five loans totaling $673,000. As of February 14, 1954, $378,596.42 has been repaid on the principal and $16,065.93 on the interest. In addition, the borrower had paid $123,693.57 ahead of schedule.

To Sell Better Home Lighting

Now being distributed to electric utilities and to furniture stores and other retailers by General Electric's lamp division is a package of promotional material. It is designed to capitalize on the opportunity to sell portable lamps which is offered by the celebration of Light's Diamond Jubilee.

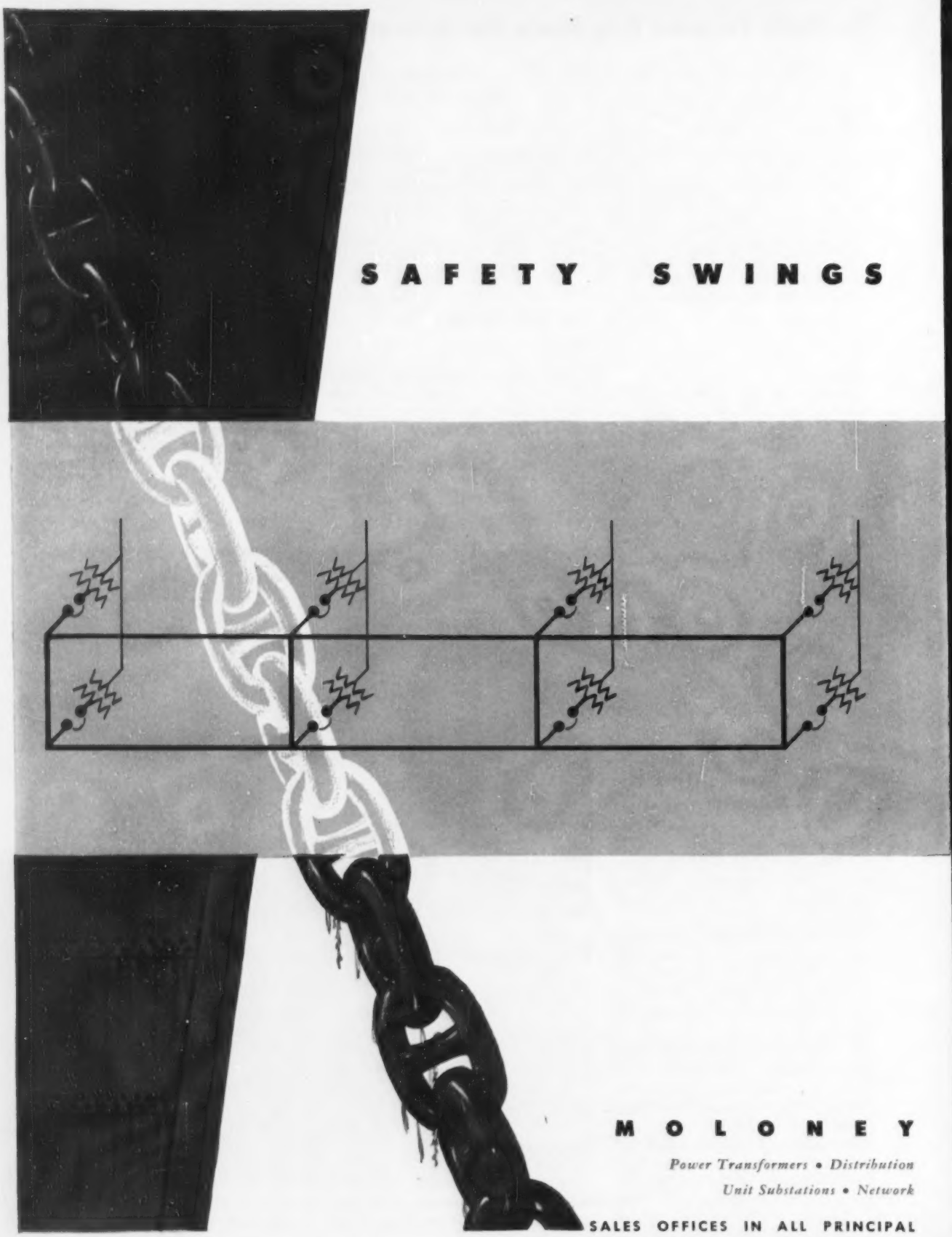
Included in the promotional kit is an explanatory letter pointing out the impact of national and local jubilee events on the industry-wide home light conditioning program; a new 16-page booklet entitled "Lamps Make the Difference," showing 25 effective lamp ensembles selected by C. Eugene Stephenson, nationally famous designer; a buyer's supplement to the booklet giving detailed information about the portable lamps selected by Stephenson; a copy of the "foundation piece" of the home light conditioning program, "See Your Home in a New Light"; and a comprehensive three-page letter from the Beauty-plus Lamp Council, announcing the utility sponsored sales plan which was announced at the recent sales conference of the Edison Electric Institute.

Fluorescents Light Streets in Minnesota

Robbinsdale, Minnesota has installed 819,000 lumens of fluorescent street lighting in its business district. It is among the first and one of the brightest fluorescent street lighting installations in this area to date. It replaces 92,000 lumens of lighting, giving the community's business district about nine times as much lighting as was formerly provided.

The installation consists of 39 units and provides an average maintained output of 1½ footcandles on the street throughout the business district. There are four, six-foot fluorescent tubes to each fixture. Fixtures are of 21,000 lumens each and are on steel standards 30 ft high. Each fixture is seven feet long and projects 5½ ft over the street at the 30-ft height.

Standards are spaced at 60-ft intervals, staggered, or 120 ft apart along one side of the street. Plexiglass covers on each lighting unit protect the fluorescent tubes which were especially designed for cold weather use.



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Power Transformers • Distribution
Unit Substations • Network

SALES OFFICES IN ALL PRINCIPAL

ON A SINGLE LINK

No chain is stronger than its weakest link . . . and your network system is no more dependable than its transformers. Your network has been designed and built to bring your customers the most dependable service. But today's increased usages put new and unexpected strains upon equipment . . . cause failures that throw unexpected loads on interconnections, increase maintenance costs.

Prepare your system for overloads . . . install transformers that you know can help you over the humps . . . products of a manufacturer who has built his reputation with dependable equipment. Moloney Network Transformers are available for any type of installation. Forge your network with the strongest links . . . make it Moloney all along the line.

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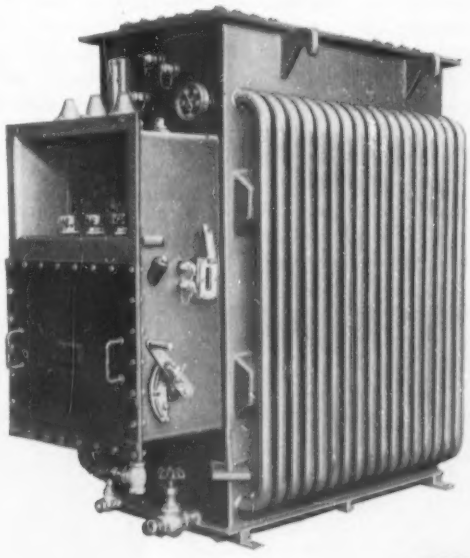

500 Kva, 3 phase, 60 cycle, Askarel filled Network Transformer, rated 13800 volts Delta high voltage, 208Y/120 volts low voltage with four 2½% high voltage taps below normal. High voltage entrance through 3 single conductor wiping sleeves, terminating in an askarel filled 3 pole, 3 position combination disconnect and grounding switch.

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Transformers • Step Voltage Regulators • Regulating Transformers • Load Ratio Control Transformers
Transformers • Constant Current Transformers • Capacitors • Transformers for Electronics

CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Naughton Heads Utah P&L

Utility veteran named president and general manager to succeed Gadsby. Cushman, Moffat made VP's

EDWARD M. NAUGHTON

Edward M. Naughton has been named president of Utah Power & Light Co to succeed George M. Gadsby, who will continue as director and chairman of the board. Naughton, formerly vice president and general manager, will serve as both president and general manager.

New Vice Presidents . . . In other changes, Utah P&L promoted Joseph E. Cushman and David D. Moffat, Jr, to new posts of vice presidents. Moffat formerly was assistant to the president and Cushman commercial manager of the company.

All changes took effect July 1.

Naughton, who received a mechanical engineering degree from Notre Dame University in 1923, attended Westinghouse Electric Corp's engineering school before joining Production Division of Texas Power & Light Co in 1925.

Executive Aide . . . When he went to Utah P&L in 1935, Naughton was appointed superintendent of steam generating plants. In 1942 he became assistant to J. A. Hale, vice president in charge of engineering, construction, and operations. He was named assistant manager in 1950.

For six months in the period 1952-53, he was "on loan" to the government as director of the Engine and Turbine Division of the National Production Authority, being named vice president and general manager at Utah P&L shortly thereafter.

Cushman, a native of Salt Lake City, joined Utah P&L in 1912. He then moved through the commercial department ranks, becoming successively assistant to Vice President R. H. Ashworth and commercial manager prior to assuming the post of vice president.

Moffatt, also a native of Salt Lake City, began with the utility in 1929. He has since served as a salesman, lighting specialist, division sales manager, rate engineer, research engineer, staff engineer, assistant to Vice President Hale and assistant to Chairman Gadsby.

Gadsby's career with Utah P&L dates back to 1929 when he left Electric Bond & Share Co to become president of the Utah company. Prior to this he was president for several years of West Penn Power Co, which he joined in 1917. He graduated from Marietta College with an M.A. degree in 1907 and received a B.S. degree from Massachusetts Institute of Technology in 1909. After leaving MIT he became affiliated with American Water Works & Electric Co. While serving with American Water Works, he worked out of Pittsburgh, Little Rock, Ark., and New York.

Former EEI Head . . . An active figure in industry-wide groups, Gadsby served as president during 1951-52 of Edison Electric Institute.

JOSEPH E. CUSHMAN

DAVID D. MOFFAT, JR

AIEE Elects Monteith President, 5 New VP's

A. C. Monteith, vice president in change of engineering and research for Westinghouse Electric Corp, has elected president of American Institute of Electrical Engineers.

New vice presidents elected for two-year terms were G. J. Crowes, Simplex Wire & Cable Co, Cambridge, Mass.; J. P. Neubauer, Consolidated Edison Co of New York, Inc; Claude M. Summers, General Electric Co, Fort Wayne, Ind.; S. M. Sharp, Southwestern Gas & Electric Co; and John R. Walker, Bureau of Reclamation, Billings, Mont.

Elected for four-year terms as directors were L. F. Hickernell, Anaconda Wire & Cable Co, Hastings-On-Hudson, N. Y.; Roy E. Kistler, Pacific Telephone & Telegraph Co, Seattle, Wash.; and Edwin S. Lammers, Jr, Westinghouse Electric Corp, Atlanta, Ga.

Elections of these officers were held last spring. AIEE announced the results at its Summer and Pacific General Meeting held recently at Los Angeles.

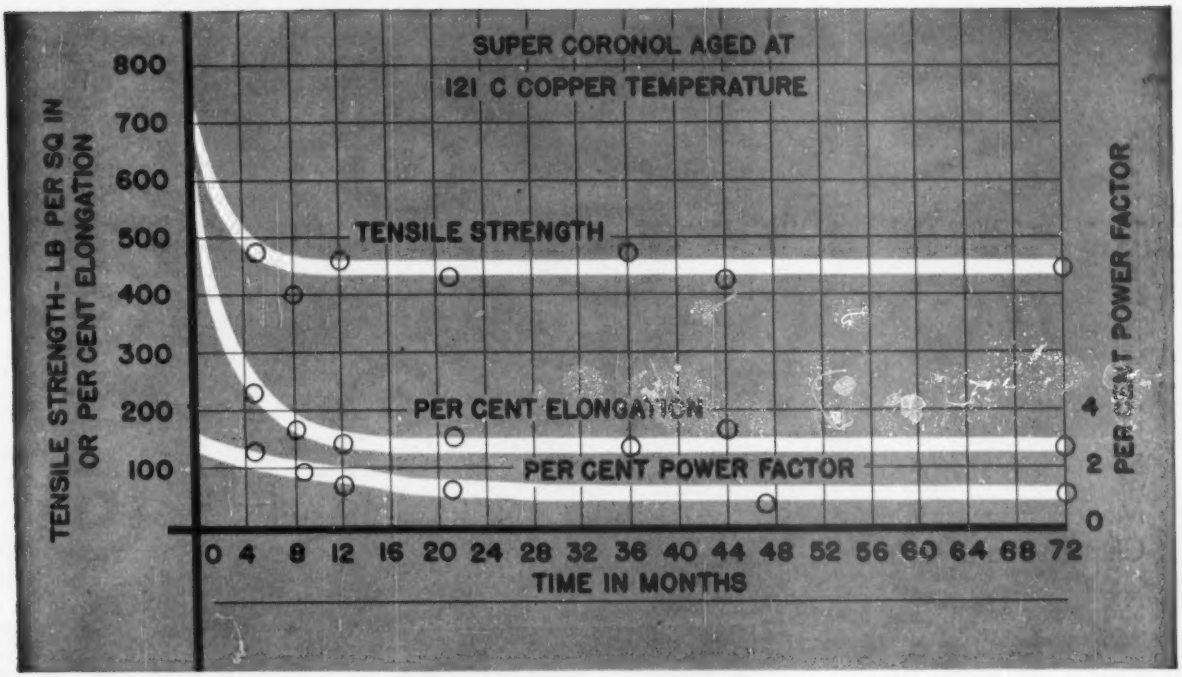


Fig. I: Physical and electrical properties of G-E Super Coronol cable as demonstrated by long-time tests at 121 C copper temperature.

Greater service-life expectancy from General Electric Super Coronol cable

Aging tests at 121 C give results equal to 72 years test-life at operating temperature

General Electric Super Coronol* cable has been tested under load for six years at a continuous copper temperature of 121 C. Both physical and electrical properties have been stable since the 20th month. (See Fig. I.) Following the general rule that insulation life is doubled for every 8 to 10 C decrease in temperature, these data at 121 C indicate from *72 to 135 years of test-life* at the rated temperature of 85 C.

These tests, supplemented by many others, demonstrate the justification for basing the ratings of all G-E Super Coronol power cables, for service up to and including 8000 volts, on a permissible maximum copper temperature of 85 C, and for permitting emergency overload temperatures. (See Fig. II.) Super Coronol cables are available as single-conductor cables (shielded and unshielded), preassembled aerial cables, submarine cables, and power cables. For further information on Super Coronol cables and other General Electric wire and cable products and systems, consult your G-E cable specialist, or write Section W-113-727 Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

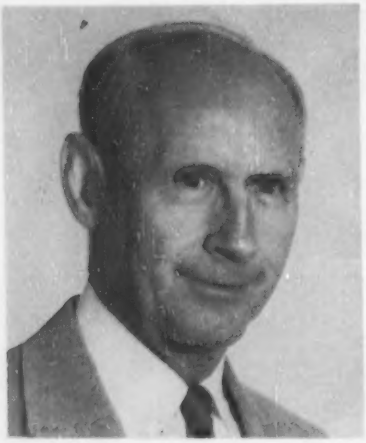
Fig. II: Allowable Operating Temperatures Super Coronol-Geoprene Cable

Voltage Rating	Normal Loading	Emergency Overloading	Short Circuit Loading
0-1000	85 C	115 C	150 C
1001-5000	85 C	102 C	145 C
5001-8000	85 C	100 C	140 C
8001-15000	80 C	90 C	120 C

*Registered Trade-mark General Electric Company

Progress is our most important product

GENERAL ELECTRIC



S. B. CHASE, JR

Montana Power Elects Chase VP and Counsel

S. B. Chase, Jr, a legal counsel of Montana Power Co since 1924, has been elected vice president and counsel of the utility.

Chase, who is associated with the law firm of Jardine, Chase & Stephenson, Great Falls, Mont., has been a director of the utility since May, 1953. Since 1930 he has devoted considerable time to special assignments on legal problems related to Montana Power's electric and gas business.

OVEC's Load Coordinator Chief is Charles Rogers

Charles H. Rogers has been appointed chief system load coordinator for Ohio Valley Electric Corp. In his new capacity, he will coordinate the delivery of electric power to the forthcoming Portsmouth Area Project of the Atomic Energy Commission located in Pike County, Ohio.

Rogers has been assistant treasurer and chief power pool dispatcher for the Interchange Power Services, Inc, of Des Moines, Iowa, supervising operations of the United Power Pool which serves four electric companies in Illinois, Iowa, Missouri, and Kansas.

He joined the Des Moines group in 1947 after working for a number of years with the Tennessee Valley Authority.

•

Carl E. Egeler, illuminating engineer in the application engineering department of General Electric Co's Lamp Division at Nela Park, Cleveland, has retired after 40 years' service. Well known in the industrial lighting field, he more recently has contributed to the work of several Illuminating Engineering Society committees, including the lighting of central station properties.

John B. Madigan has been appointed assistant treasurer of Hartford (Conn.) Electric Light Co. He joined the utility in 1935.

Frederick C. Jarvis, assistant plant engineer at Potomac Electric Power Co's Benning Station, has been appointed plant engineer and will assume full responsibility for the station's operation. Replacing Jarvis as assistant plant engineer is **Charles H. Evans,** formerly test engineer there.

ROBERT J. KRIEGER

Krieger Named Sales VP

Robert J. Krieger, sales manager of Riley Stoker Corp, Worcester, Mass., has been appointed vice president of sales. He was affiliated with Underfeed Stoker Corp of America, Detroit, before joining Riley Stoker in 1922 as manager of sales service department. In 1949 he was made sales manager, a post he filled until his recent appointment.

•

James K. Pickard has resigned from the Atomic Energy Commission to open a consulting practice office in Washington, D. C. Pickard, who will specialize in atomic energy developments, formerly served in the Industrial Power Branch of AEC's Reactor Development Division, where he set up and administered the commission's industrial participation program.

John W. Mueller, who has been for the last eight years a member of the Bureau of Reclamation's staff in Region II in Sacramento, has been assigned by the Foreign Operations Administration as an electrical engineer on the staff of the U. S. Operations Mission in Turkey to work as a member of the reclamation advisory team.

OBITUARY

Dr Karl T. Compton

Dr Karl T. Compton, 66, one of America's top scientists and a leading figure in development of the atomic bomb, died June 22 in New York.

He had been chairman of Massachusetts Institute of Technology Corporation since 1949, and served as institute's president from 1930 to 1948. He left the presidency to become head of the Research and Development Board of the National Military Establishment, resigning in 1949.

A physicist, he had served on the teaching staffs of Wooster (Ohio) College, Reed College, Portland, Ore., and Princeton University before going to MIT. He received his bachelor's and master's degrees from Wooster and his Ph.D degree from Princeton in 1912.

Dr Compton, a director of McGraw-Hill Publishing Co, was the recipient of these awards: Rumford Medal in 1931, U. S. Army's Medal of Merit, 1946, and the Hoover Medal, 1950.

Rawson Vaile, 67, executive vice president and director of American Blower Corp, Dearborn, Mich., died at Detroit June 19. Since joining the firm in 1912 as a sales engineer, he served as general sales manager, assistant secretary, secretary, treasurer, becoming executive vice president in 1933.

James H. Walker, 72, former Cleveland district manager for Ohio Brass Co, Mansfield, died June 12 at Shaker Heights, Ohio. He served the firm as district manager for 28 years from 1922 through 1949 when he retired.

it's time for a new meter...

when Mrs. Forbes...

gets her automatic laundry

Better look at the Forbes' meter—it's probably inadequate. It was never designed to measure a load like this. It may run slow on heavy loads, or it may burn out.

The Sangamo J2, the meter with straight-line accuracy up to 100 amperes, will prevent lost revenue. The J2 has adequate capacity to carry 100 amperes continuously without overheating and sufficient torque to accurately measure even the lightest load.

The J2 is *the* slow-speed meter that makes fewer revolutions per kilowatt-hour—bearings last longer.

When you buy new meters to handle today's growing use of electricity, protect your investment by choosing a meter with plenty of reserve capacity for continuously growing loads.

Choose the new Sangamo J2—the first . . . and finest . . . 15 ampere meter with 100 ampere capacity.

A METER WITH STRAIGHT LINE ACCURACY

UP TO 100 AMPERES

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM546

$14 Billion Appliance Market . . .

. . . is predicted for next five years by Nema president at National Association of Electrical Distributors convention

As many as 428 million portable electrical appliances may move into America's homes over the next five years.

This was the prediction of James H. Jewell, vice president, Westinghouse Electric Corp and president of the National Electrical Manufacturers Association. He addressed more than 2,400 delegates at the 46th annual convention of the National Association of Electrical Distributors held in Atlantic City, June 7-11.

Higher Sales Predicted . . . Jewell said sales of apparatus and supplies should hit $14 billion over the next five years and the residential market should increase about 82% between now and 1963.

Electrical energy consumed by all forms of air conditioning and refrigeration should reach 45.4 billion kwhr and 182 billion kwhr for lighting in 1963, he declared. Industrial lighting will increase 60% and residential and rural lighting will double in the next decade. Modernization probably offers the distributor the largest potential in practically every field, Jewell said.

The sales organizations of all phases of the electric industry must supply customers with the appliances and equipment to make possible the continued growth of the industry, said Bayard L. England, president of Atlantic City Electric Co. Increased and intensive selling at all levels is necessary, he added, especially of those appliances which have a comparatively low saturation rate.

"We must devote our best efforts to increasing the applications of electricity in the home, on the farm, in the factory, wherever they may bring maximum benefits to the American people," he said.

Editors' Panel . . . In a panel discussion among editors of McGraw-Hill publications covering "The Outlook for the Last Six Months of 1954," Fischer Black, editor and publisher of Electrical World, said residential and commercial loads are increasing faster than predicted last fall. The last half of 1954 looks better than the first half in utility load growth and equipment orders. 1955 should be as good or better than 1954, he said. According to Kenneth Kramer of Business Week, the next six months could be "either a leveling of business generally or even a beginning of an overall rise in business activtiy."

"We may have to settle for a leveling out through the remaining months of 1954," he said.

For the end of '54, William W. MacDonald of Electronics predicted larger color TV tubes and lower-priced color television sets; more color-television programs; lower priced monochrome television sets and continued growth in the number of regular radio broadcast stations.

Berlon C. Cooper of Electrical Construction and Maintenance said the electrical construction market has been growing this year and will continue growing to the end of 1954, probably up to 5%. Electrical construction volume is growing at a faster pace than new building construction volume because contracts for new building construction are far ahead of those for last year, Cooper said.

JAMES H. JEWELL

Arthur W. Hooper of Electrical Wholesaling said wholesale distributors are charging too little for their services in view of their experience, ability and equipment. He said the outlook for the next six months depends not only on the basic strength of our economy but also on what action is taken by wholesalers to maintain their professional status by charging professional rates.

According to Laurence Wray of Electrical Merchandising, volume levels of appliances this year will hold fairly close to last year. Air conditioners are running 100% over '53 at present, he said, but radio sales are slipping badly and should be off sharply.

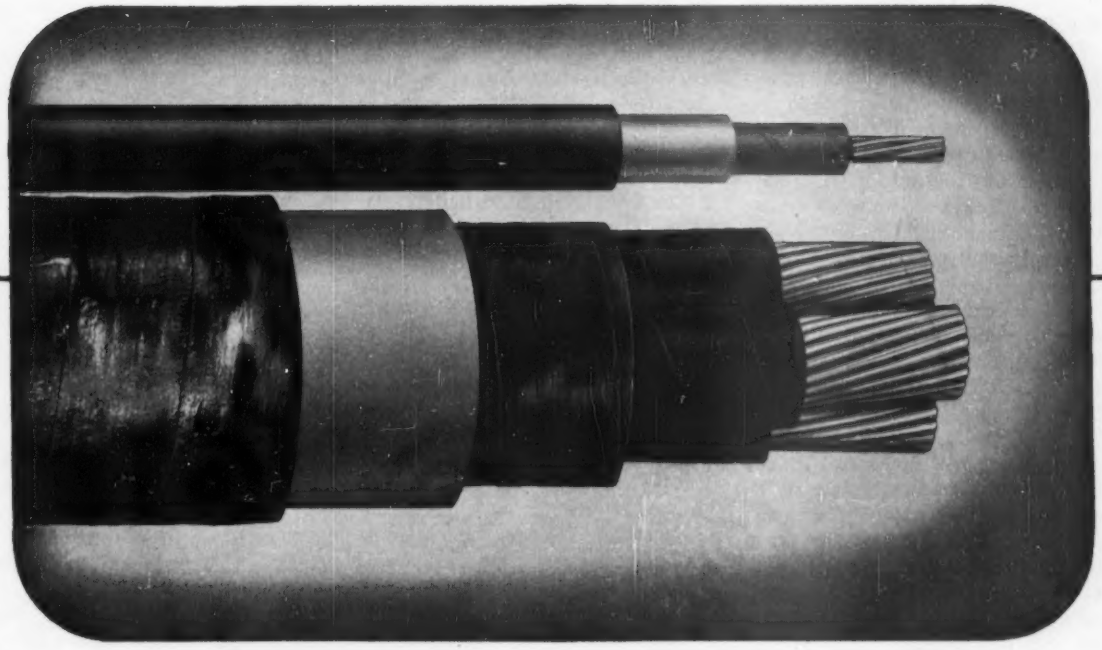
"We are in for some profound changes in our methods of distribution, Wray said. "We are going to have to face the fact that a new day is dawning in our business—and it may be accompanied by a pretty heavy hangover."

For Cool Sales . . . The room air conditioner has arrived as the bright hope of the appliance business, said R. E. Cassatt, Fedders-Quigan Corp. There is no other major appliance that can be sold in real volume to both home and business, he stated. The ripest prospect is the one who already owns one—if he has one in his office, it won't be long before his family is enjoying one at home, and vice versa, Cassatt added. The industry should be able to sell 2 million room conditioners worth $700 million in 1955, he declared.

Nine out of ten stores, factories, offices, schools, restaurants and other commercial buildings need—and can be sold—lighting adequate to their needs, said E. C. Huerkamp, Westinghouse Electric Corp. This replacement market is being neglected because of inadequate preparation by lighting salesmen to exploit it, he added. The Nema National Lighting Bureau program has been formulated to capitalize on this opportunity and to supply information, guidance and inspiration to local groups promoting sales in each community, Huerkamp stated.

ROEBLING PROTECTIVE COVERINGS ON LEAD SHEATHED CABLE

for utilities, chemical plants and the petroleum industry



LEAD SHEATHED CABLES used in certain applications by public and private utilities, chemical plants and the petroleum industry are often impaired by electrolysis or chemical corrosion. But such corrosive action can be effectively reduced, and cable life extended, by using Roebling Paper Insulated and Varnished Cambric Cables with either of two outer protective coverings.

One of these coverings is an extruded thermoplastic sheath employing a special high-molecular weight polyethylene. The other is ROESHEATH, built up of neoprene and neoprene-filled fabric tapes and vulcanized directly over the lead sheath. Both coverings not only provide essential protection, but, in some cases, may permit the thickness of the lead sheath to be reduced.

For longer, more dependable cable life and worthwhile economy write for full information... and get our recommendations for solving any special problem.

John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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CF&I

Briggs Memorial Scholarship

Award, set up by Citizens Utilities to honor its former official, offers financial aid to high school graduates

Establishment of the "Citizens Utilities—Joseph C. Briggs Memorial Scholarship" as a part of a program of financial assistance to high school graduates desiring to pursue education at higher levels, has been announced by Richard L. Rosenthal, president of Citizens Utilities Co.

The scholarship award will culminate a nationwide competition among children, grandchildren, brothers or sisters of employees of Citizens Utilities.

It has been established as a memorial for the former administrative vice president of Citizens, who died in an automobile accident in November, 1951.

$500 Award Will Be Made . . . The award will be made each year in the amount of $500, resulting from voluntary contributions of more than twenty-five employees associated with Citizens Utilities and a contribution by the company. It will be made on the basis of scholastic records in high school, recommendations of school and community leaders, and a brief competitive examination to be given the applicants.

Announcement of awards for the 1954-55 school year will be made between August 15-31, 1954.

The company is also establishing a program of making available subsequent on-the-job training in the summer months for those who will receive scholarship awards. Citizens Utilities' president advised employees of the company that this on-the-job training experience would supplement academic training for those receiving scholarship awards and would also enable students to earn something toward the cost of their subsequent year's education.

In a letter addressed to the company's employees, he stated: "This program has been designed to assist those children in our Citizens Utilities' family whose secondary school records demonstrate that they deserve and can utilize the benefits of higher education . . . The award is part of our effort to make a continuing contribution to the American tradition: Opportunity for ability and reward for endeavor—regardless of origin or creed."

Effective 'Communication' Urged by CEI's Lindseth

"More hard work and horse sense" are required to solve the communication problems of American industry, Elmer L. Lindseth, president of Cleveland Electric Illuminating Co, said recently at the Harvard Business School's 24th National Business Conference in Cambridge, Mass.

"The modern executive spends 60% of his time attempting to communicate in one way or another," he told the conference. "Unless he is adept at making himself understood, and at understanding others, his time is wasted and his business suffers accordingly.

"For the effective application of the almost limitless techniques of communication, we must have what is variously described as the proper 'climate' or proper 'attitudes' on the part of those who are communicating their ideas."

The utility president listed the following among the principal barriers to effective communication:

1. Absence of a proper climate of confidence and mutual understanding.
2. Failure to realize the emotional and psychological nature of communication.
3. Lack of motivation to communicate.
4. Inability to listen intelligently.
5. Failure to measure the effectiveness of our communication.
6. Failure to encourage upward and lateral, as well as downward, communication.

LABOR BRIEFS

Connecticut Light & Power Co and International Brotherhood of Electrical Workers, AFL, have agreed to a 5% general wage increase, retroactive to May 30 when the former contract expired . . . **Tennessee Valley Authority** has granted salary increases averaging 3% to 7,200 white collar employees . . . **Los Angeles** Department of Water & Power has approved a 3% wage hike for 10,352 of its employees, effective July 1.

EEI-Nelpa Labor Parley Set

Supervisory development, communications, and collective bargaining and contract administration are the three main subjects to be discussed at a joint meeting of the Industrial Relations Committee of the Edison Electric Institute and the Personnel and Safety Section of the Northwest Electric Light & Power Association to be held at the Multnomah Hotel, Portland Ore. on July 12-13.

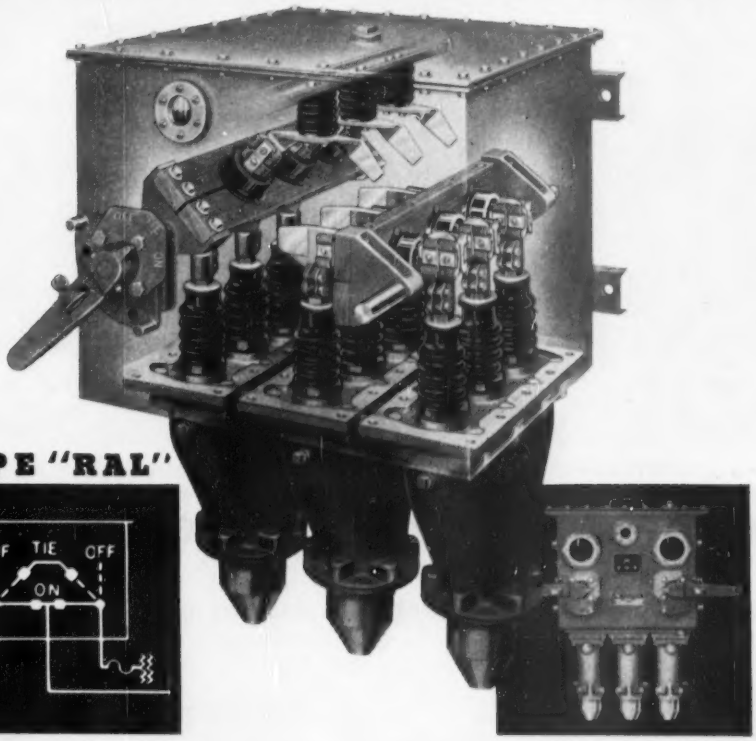
The meetings will be covered in panel fashion on three half-days, while the fourth half-day will be used as a clean-up session.

Fred R. Rauch, vice president of Cincinnati Gas & Electric Co and chairman of EEI's Industrial Relations Committee, will divide presiding honors with Pat Holden, Utah Power & Light Co, and chairman of northwest group's Personnel Section. A. W. Trimble, vice president of Pacific Power & Light Co and president of Nelpa, will welcome the visitors to the joint conference.

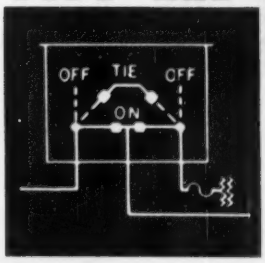
Two luncheon sessions will round out the program, with Paul B. McKee, president of the Pacific P&L, as the principal speaker at one, and W. Lloyd Vinson, business manager of International Brotherhood of Electrical Workers, AFL, Local No. 125 in Portland, at the other.

provide safe sectionalization for
cable system flexibility with

G&W
load break oil switches



TYPE "RAL"



Type "RAL" oil switches with three ways (2 feeder and 1 load), two sets of links, and tie buses are designed for use on loop circuits and in other situations where similar flexibility would otherwise require three separate oil switches with correspondingly greater expense for equipment, installation, and space.

These oil switches materially reduce the length of time required for restoring service in case of trouble, or for isolating a circuit to make changes. Load break disconnection of a circuit is accomplished by manually operating an external lever—without opening the tank or breaking the oil and moisture seals.

Bulletin DB51 gives complete data and prices. Write for your copy or ask your representative.

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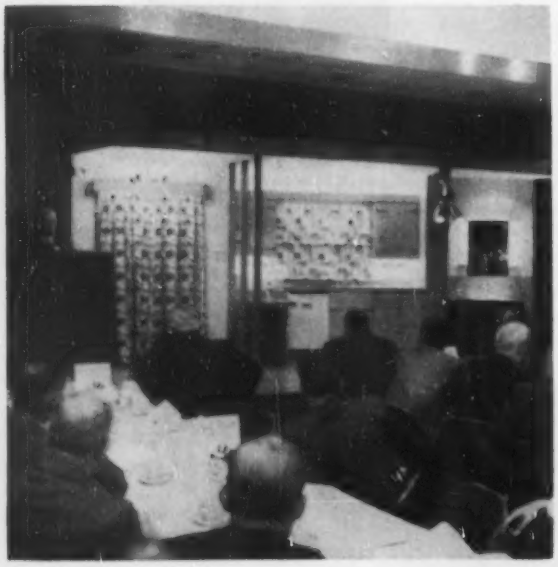
D543

G&W

ARCHITECTS, HOME BUILDERS and wiring contractors were shown what their customers will want in the way of good lighting and how to give it to them. Industry groups gathered, 150 strong, to hear what company is doing to create demand for good lighting

Drive Stirs Desire for Better Light

Response to newspaper ads indicates interest. Industry groups show enthusiasm



FOR BETTER SIGHT—Decorate With Light is spring theme

DINNER IN THE COMPANY lunch room was part of meeting

Don't Let Glare and Gloom Give You the "Kitchen Blues!"
For only $6.38, Mrs. Hugh Mianis of 3848 Ashland Ave., St. Louis, made her kitchen more cheerful, her work far easier!
For Better Sight... Redecorate with Light!

ADS FEATURE local case stories with cost figures that show how inexpensively better lighting can be obtained through simple modernization

LIGHTING APPLICATION DEMONSTRATOR in company sales room can duplicate home conditions and show lighting recommendations

Union Electric Co has launched a continuous year-round lighting promotion. It is directed to the general public through an intensive advertising campaign. Such slogans as "For Better Sight, Decorate With Light" and "Old Fashioned Glare and Gloom Have No Place in Your Living Room" emphasize the benefits of modern lighting.

This program has two objectives: One, utilize newspaper advertising to show customers how they can improve their lighting through their own efforts without consulting the utility or others. The circulation of each St. Louis metropolitan newspaper is in excess of 300,000 daily. Union Electric hopes to build lighting load through newspaper advertising directly. Two, stimulate interest in improved lighting leading to inquiries to the company. A residential service saleswoman responds to the customer's inquiry and makes lighting recommendations on a room by room basis.

The program is aimed at making the public appreciate and want good lighting. It drives home such points as:

1. Adequate light for the task.
2. Freedom from glare.
3. Correct distribution of lighting.
4. Correct placement.

Newspaper ads so far have featured "old fashioned" glare and gloom in every room in the house and have told how to chase them with better light. They have carried case stories of local people and the cost of actual lighting improvements made in these homes.

In the summer, outdoor lighting will be covered and the ads will show how to get desired effects.

Other ads feature "Five Easy Ways to Redecorate . . ." your living room, your bathroom, your kitchen, your bedroom.

All ads carried coupons. Personal calls are made on customers who fill out and mail the coupons.

Radio and television are also telling the story "For Better Sight-Redecorate With Light". The program is creating a desire for good lighting as an integral part of the home.

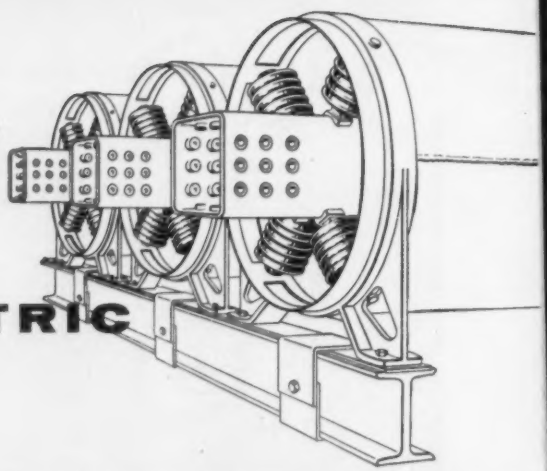
Architects, builders and wiring contractors have been told what the company is doing, that they can expect their customers to appreciate good lighting and the adequate wiring essential to it. At a meeting in the company's service headquarters 150 representatives of these three groups gathered to hear the story. They were shown, with equipment and demonstrations, how they could meet the public demand for better lighting which the company is creating.

The company has developed an ingenious lighting demonstrator which enables sales personnel to duplicate on the sales floor any lighting situation found in a customer's home and to recommend improvements.

The booklet "Facts of Light" assists the residential service saleswoman in offering the same service in the customer's home.

Department stores and lighting equipment dealers have supported Union Electric's activity very actively with newspaper advertising and window and point-of-sale displays. The interest is attested by more than one hundred inquiries resulting from one of the advertisements.

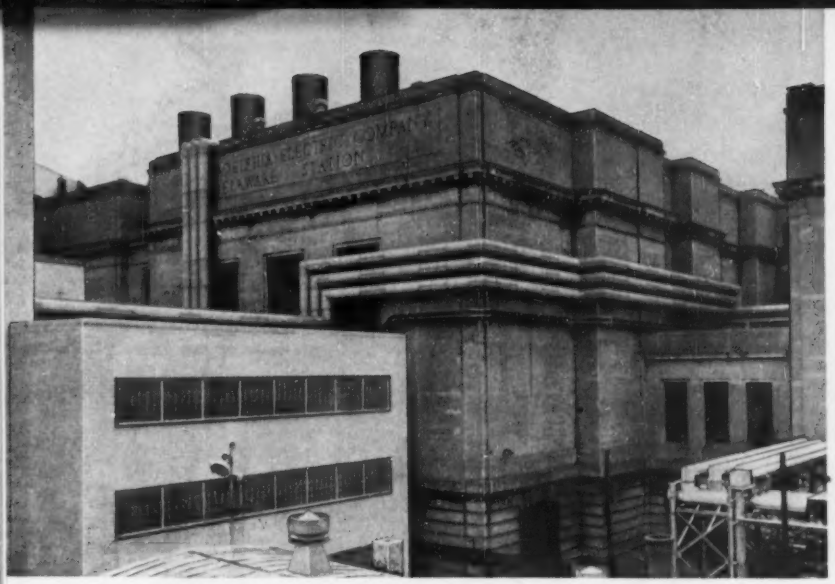
Power on the move at PHILADELPHIA ELECTRIC



The unprecedented growth of the Delaware Valley is creating huge demands for power—for industry, for homes, for commerce. The sale of electricity, which already has multiplied ten-fold since 1920, is climbing toward a further 50 percent increase before 1960!

As big industry develops and expands, electric power companies have to plan far in advance to be able to supply power for increased requirements. Philadelphia Electric Company is well prepared to meet today's power needs, as well as those in the foreseeable future. A million dollars a week is being spent to provide an undiminished supply of electric power for "the world's greatest industrial area."

Typical of Philadelphia Electric Company's "power for progress" is the modernization and expansion of the vital Delaware Station. PE has made extensive use in this station of I-T-E Isolated Phase Bus.



COMPLETED INSTALLATION showing Isolated Phase Bus running along outside walls and over the roofs. Sections are designed for long, straight runs—or to fit small, cramped quarters—for both inside and outside installation.

DURING INSTALLATION prefabricated sections were delivered to site completely assembled . . . ready to fit in place.

All power generated at *Delaware Station* now feeds through Isolated Phase Bus

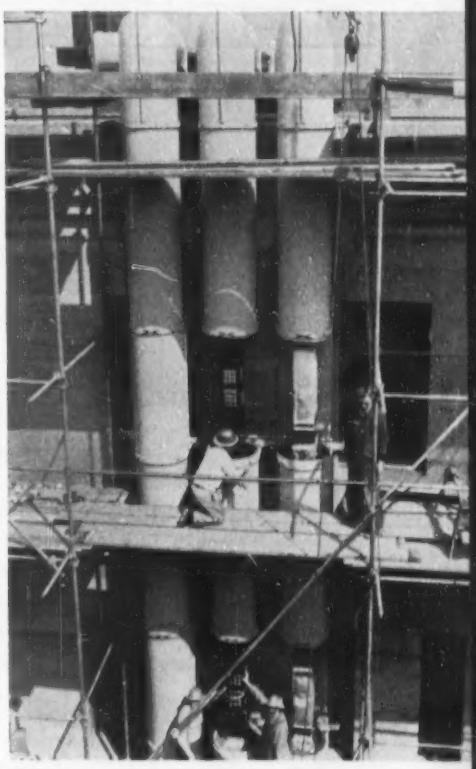
Throughout the station are more than 8700 single-phase feet of I-T-E Isolated Phase Bus. The installation includes long, straight outdoor runs utilizing large assembled units—and short lengths in cramped indoor locations where small pieces are necessary.

In planning the modernization and expansion of Delaware Station, Philadelphia Electric Company engineers decided on the use of I-T-E Isolated Phase Bus because of the following advantages:

Construction is sturdy and compact
Phase-to-phase faults are eliminated
Ground bus can carry a phase-to-ground fault
Porcelain is used to best advantage (in compression only)
High degree of safety afforded to operating personnel
Ease and flexibility of installation cut costs
Minimum maintenance is required

From the start, I-T-E Application Engineers worked in close cooperation with Philadelphia Electric Company engineers. I-T-E prepared comparative estimates, and suggested ways to utilize basic assemblies—thus minimizing investment and delivery time. Factory-matched and -assembled lengths, easily adaptable to both the old and new construction, were delivered *on time*, ready for installation.

For details contact the I-T-E Field Office nearest you. Look in your classified directory under "Electric Equipment."



FACTORY-MATCHED SECTIONS are erected to follow building contours. Conductor connections are made. Alternate welded covers and minimum gasketing assure a tight assembly . . . save erection time.

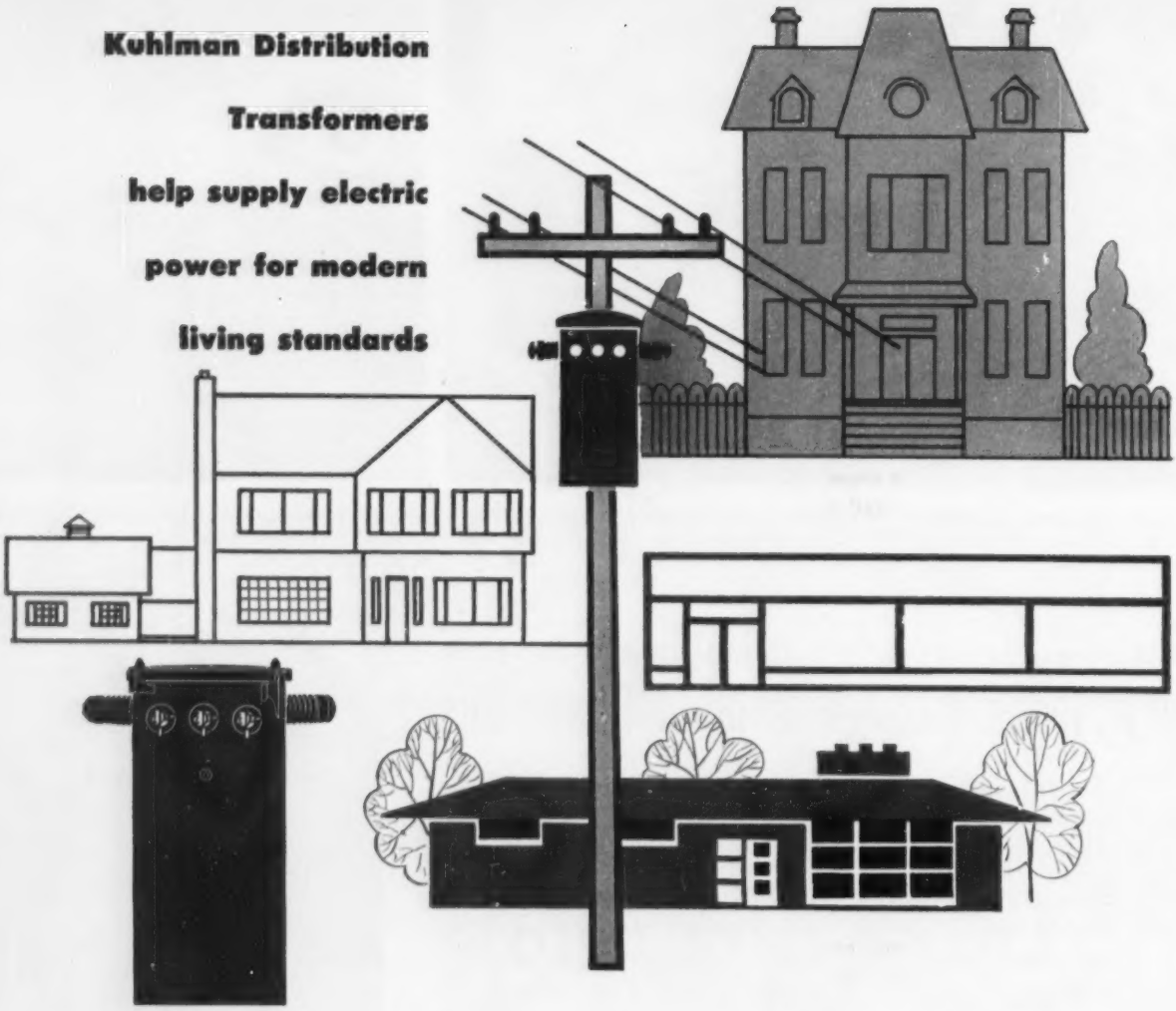
THE SYMBOL OF QUALITY SWITCHGEAR

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PA.

ISOLATED PHASE BUS

Kuhlman Distribution Transformers help supply electric power for modern living standards



Kuhlman Distribution Transformers, specifically engineered for dependable, low-cost service, help utilities provide a steady and reliable source of power to American homes. Under operating conditions of varying loads these units give exceptionally good voltage regulation. The bent iron core construction permits full utilization of the best qualities of transformer steel and requires very little reactive power from a distribution system.

Insulation of Kuhlman Transformers is coordinated with the basic impulse level. Wide oil ducts insure ample cooling. Construction throughout is sturdy and rigid. Careful finishing of the sealed copper bearing steel tanks insures long service under the most difficult weather conditions.

Kuhlman Distribution Transformers are built by highly experienced electrical technicians, many of whom have been on the job at Kuhlman for fifteen to twenty years. Kuhlman Distribution Transformers are produced in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202, and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

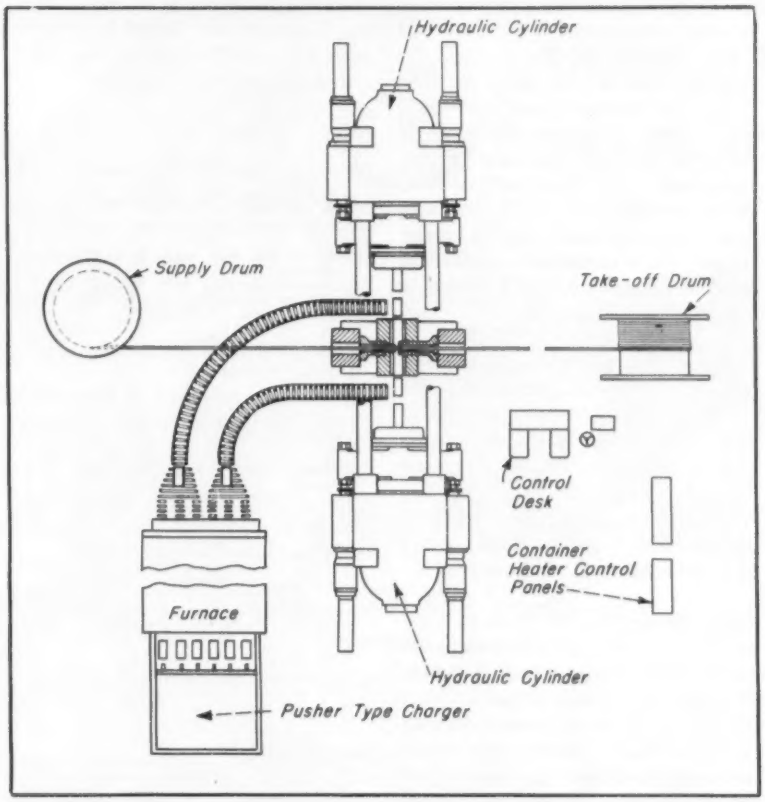
152-M

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY



Press Extrudes Al Sheathing . . .

. . . for power cables in a continuous length. Machine developed by British firm will handle sizes up to 3.5-in. diameter

LONDON, (McGraw-Hill World News)—British Insulated Callender's Cables, Ltd, and the Loewy Engineering Co have jointly developed a press for the continuous extrusion of aluminum power cable sheathing. Called the ALSHEATH press, the patented unit has passed initial operation tests and is currently made by Loewy.

The press meets these conditions:

- Uses commercial grades of aluminum
- Is charged with solid billets
- Works at extrusion temperatures not exceeding 300 C
- Produces sheathed cables in long continuous lengths
- Manages satisfactory welds between successive billets
- Has minimum charging time, prevents overheating cable
- Avoids deformation and metallurgical features at stop-marks.

The press is hydraulically operated by two horizontally opposed cylinders (see diagram above) each 45-in. in diameter, operated at 4,280 psi, and each giving nominally 3,000 tons capacity. Twin billets are extruded through a common core and die to give sheaths ranging from 1.4 to 3.5-in. diameter.

Cable passes through the press at right angles to the axis of the cylinders, permitting use of solid billets and reducing the length of cable exposed to the heat of the press. Extrusion tools are mounted in a manner to retain their positions and the gap between them constant regardless of elastic deformation due to changing heat conditions.

Extruded sheathings are free of weakness at "stop-marks," the point on the sheath in the die when cable is stationary for recharging. The speed of extrusion from the two containers is constantly balanced by special controls. Mechanical loading facilities allow recharging in seconds.

Welds between successive billets are not discernible in the extruded sheath. Special attention has been devoted to prevention of air inclusions.

All major movements are controlled by servo-operated valves from a central console, providing for fully automatic or individual control.

With 99.8% pure aluminum and extrusion temperature of 280 C, the extruded sheaths are in the lightly annealed condition. Tensile strength is 5.0 to 6.0 tons per sq in. Elongation on a length of two inches in the longitudinal direction of the sheath is 30 to 50%, depending on diameter and thickness. Grain size is fine on all parts of the sheath, including stop-marks. The springiness associated with cold working is largely eliminated.

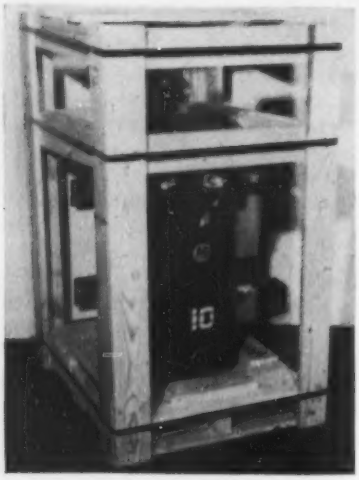
Roebling Is Producing Tellurium-Lead Sheath

John A. Roebling's Sons Corp is in full commercial production of tellurium alloy lead sheath cable. The solid-type impregnated paper-lead power cable with the alloy sheath is produced under license from General Electric Co. Nearly 150,000 ft of cable have recently been sold for commercial installations.

Cable sheaths of this alloy are claimed to possess stabilized bending and creep resistant properties of superior quality. It is extruded on a standard lead press and allows a wide range of heat treatments. Application of heat for joint wipes does not destroy its desirable characteristics.

Canadian F. H. McGraw

Incorporation of a new Canadian engineering and construction firm to be known as F. H. McGraw Co. of Canada (1954), Ltd, has been announced by the Power Corp of Canada, Ltd, and F. H. McGraw & Co, engineers and constructors of Hartford, Conn., and New York City. Montreal will be headquarters for the new firm which was issued a Canadian charter in April.



Palletized Crate Eases Transformer Handling

Allis-Chalmers distribution transformers are being shipped in a new style crate designed for easy handling with fork lift trucks. Two units may be lifted with a fork truck—each unit inclines toward the center to keep the load stable. The pallet bottom can be saved and used for other materials.

Side bracing to distribute loads eliminates need for runners when stacking units. Stacked crates are keyed to adjacent crates above and below, permitting safer and higher stacking.

MANUFACTURING BRIEFS

Wagner Electric Corporation, St. Louis, Mo., announces the relocation of its Atlanta Electrical Branch Office and Automotive Branch Office to a new building at 1536 Boulevard Ave, N. E. The building has 20,000 sq ft of floor space and air-conditioned offices.

Arthur D. Little, Inc has acquired the research and development division and laboratories of The Merrill Co in San Francisco. To be known as the Western Laboratories Division of Arthur D. Little, Inc, the laboratories will make research and product development conveniently available to West Coast industry.

The French electrical equipment industry has obtained approval to float the loan to finance modernization. The French Minister of Industry and Commerce is searching for ways to lower electricity and gas prices, reported in a large measure responsible for French prices being higher than those of competitors.

General Electric Co plans to construct a $5-million plant at Shelbyville, Ind., for manufacture of industrial furnaces, induction heating equipment, and heating devices. When completed in 1955, the new plant will consolidate the Industrial Heating Department now at Pittsfield and Schenectady. About 800 people will be employed.

California Institute of Technology has installed a high-current mobile test stand capable of delivering 200,000 amp. The project was sponsored by Cole Electric Co, Culver City, and Kelman Electric & Mfg Co, Los Angeles. This high current equipment complements high potential equipment installed some 30 years ago.

Slater Electric Co of Folsom, Calif will erect a 3-mi, 115-kv transmission line on the south end of Sacramento. The steel tower line will feed a $930,000 substation now under construction. SMUD plans two 69-kv subtransmission lines to radiate from the station into the southern Sacramento County rural area and four 23-kv feeder lines to serve the southern section of Sacramento.

American Elin Corp of Austria was low bidder at $137,120 for four single-phase transformers for The Dalles Dam, a Corps of Engineers project. Second lowest of the nine bids submitted was $154,650 by Central Transformer Corp, Pine Bluff, Ark.

Sylvania Electric Products Inc has commenced operations in the new 110,000 sq ft warehouse and sales offices it has leased in Teterboro, N. J. This facility consolidates several sales and service facilities previously scattered throughout the New York City area.

Westinghouse Electric Corp is supplying motors and controls, transformers and switchgear for a new paper mill the East Texas Pulp and Power Co is building at Evadale, Tex. The $950,000 order was placed by H. A. Simons Co, Ltd, consulting engineering firm of Vancouver, B. C. Deliveries are to be completed by early summer.

Electric Machinery Manufacturing Co of Minneapolis has purchased Mullenbach Electrical Manufacturing Co, Los Angeles. Charles F. Mullenbach was named executive vice-president in charge of all operations.

MEETINGS CALENDAR

Northwest Electric Light & Power Association
Personnel Section with EEI Industrial Relations Committee, Multnomah Hotel, Portland, Ore., July 12-14.

World Power Conference
Sectional Meeting, Rio de Janeiro, Brazil, July 25-Aug. 10.

Pan-American Federation of Engineering Societies
(UPADI), Third Convention, Sao Paulo, Brazil, Aug. 2-12.

American Society of Mechanical Engineers
Fall Meeting, Schroeder Hotel, Milwaukee, Sept. 8-10; Annual Meeting, Statler Hotel, New York, Nov. 28-Dec. 3.

Rocky Mountain Electrical League
Annual Fall Convention, Stanley Hotel, Estes Park, Colo., Sept. 12-15.

Illuminating Engineering Society
National Technical Conference, Chalfonte-Haddon Hall, Atlantic City, N .J., Sept. 12-16.

Public Utilities Association of Virginias
36th Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 16-18.

Edison Electric Institute
Accident Prevention Committee, Benjamin Franklin Hotel, Philadelphia, Sept. 20-21; Industrial Relations Committee, Round Table Conference, Palmer House, Chicago, Sept. 27-29; Prime Movers Committee, De Witt Clinton Hotel, Albany, N. Y., Oct. 4-5; Electrical Equipment Committee, Hotel Statler, Hartford, Conn., Oct. 11-12; Prime Movers Committee, Astor Hotel, New York, Nov. 29-30.

American Institute of Electrical Engineers
Committee on Petroleum, Conference on Electrical Applications in Petroleum Industry, Mayo Hotel, Tulsa, Okla., Sept. 27-29; Middle Eastern District Meeting, Abraham Lincoln Hotel, Reading, Pa., Oct. 5-7; Fall General Meeting, Morrison Hotel, Chicago, Oct. 11-15.

National Electronics Conference
10th Annual Conference, Hotel Sherman, Chicago, Oct. 4-6.

National Association of Electrical Distributors
Pacific Zone Convention, Mark Hopkins Hotel, San Francisco, Oct. 4-7.

Indiana Electrical Association
Annual Convention. French Lick Springs Hotel, French Lick, Ind., Oct. 6-8.

Interstate Power Club
Meetings will be held at Hotel Martinique, New York, on following dates: Oct. 11, Dec. 6.

Pennsylvania Electric Association
Fall Meeting. Electrical Equipment Committee, Hotel Robert Treat, Newark, N. J., Oct. 19-20.

Public Information Program
Workshop Conference, Chase Park Plaza Hotel, St. Louis, Oct. 28-29.

National Electrical Manufacturers Association
Haddon Hall Hotel, Atlantic City, N. J., Nov. 8-11.

***American Standards Association**
36th Annual Meeting and 5th National Conference on Standards, Hotel Roosevelt, New York, Nov. 15-17.

***Addition this week.**

THESE ARE CRANE INSULATORS

These are, left to right . . . a unit for supporting a rectangular conductor which is part of the control circuit on a crane . . . a pivot, or bearing insulator, for a pickup shoe . . . and a crane rail support. Metal parts are malleable iron, hot dip galvanized, with galvanized steel nuts and bolts. Porcelain is Lapp vacuum-process ware, chocolate-brown glazed; each porcelain body, of which you see the shell, has an integral head similar to that of a suspension insulator.

These are regularly-catalogued items, and appear in the "Industrial" section of your Lapp catalog.

But until Lapp made such units, this requirement was largely handled by insulators of organic material. Under humidity and the dirt conditions always present in industrial plants, leakage current flow would track and short-out insulators. Lapp's contribution to such service is insulators stronger, of longer life, more nearly self-cleaning, and of a material which permits leakage flow without deterioration.

Lapp has wide experience in working with engineers in the solution of all sorts of electrical-and-mechanical problems. To such a cooperative effort, we bring a keen willingness to tackle a tough problem, an ability to produce complicated or difficult ceramic pieces on a basis that makes them practical as to cost, and an ability to combine porcelain and metal parts to achieve strong, permanent, secure designs.

Perhaps you have no such problems, and so no interest in this story? Or perhaps all you have to worry about is a system involving some thousands of insulators, and equipment with insulating components (which, simple as they may look, are, in many cases, among the most complicated porcelain parts ever made). In which case, there ought to be a lot of interest on your part in insulators, and insulating components, which give an extra margin of operating security, long life and low upkeep. The kind Lapp makes.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

Winner of 1953 Annual Report Quiz

Nearly 350 supervisory employees of New York State Electric & Gas Corp participated in its Annual Report Quiz, a question and answer contest based on the company's 1953 annual report. Winner was William J. Roach (left) Brewster District operating superintendent, who is shown receiving a $100 check from company's Pres Joseph M. Bell, Jr.

Contestants were members of 25 Supervisory Conference Groups, composed largely of employees at first and second supervisory levels.

Ohio PUC Favors Fair Value on Rate of Return

Proposed Ohio legislation to eliminate the use of "reproduction cost new, less depreciation," in determination of valuations in public utility rate cases and replace it with a formula providing for a reasonable return upon the "fair value" of the property of the utility, as determined by reproduction cost new, original cost and other factors, has been favored by Chairman Robert L. Moulton of the state Public Utilities Commission. This came out at a hearing conducted recently by the state Legislative Service Commission's public utilities committee.

Such legislation was unsuccessfully introduced in the 1953 Ohio Legislature under sponsorship of Governor Lausche, who contended that the state's present rate base procedure for gas, electric, and telephone companies tends to discourage modernization. The interim study group is now considering the issue and will report its findings and recommendations to the 1955 legislature.

Moulton's support of the proposed change was at variance with views previously expressed before the study group by the PUC's other two members, Ray O. Martin, Toledo Democrat, and Ralph Winter, Lodi Republican. They had both contended that changing of the existing rate procedure would result in "chaos" and probably higher rates to consumers.

Under questioning by Ohio House Speaker William Saxbe, who heads the interim study committee, Moulton disagreed with his two PUC colleagues. He declared that changing to the "fair value" formula would prove tremendously important to cities in combatting rate increases.

Although conceding that the new "fair value" formula would tend to give the PUC broader discretionary powers than it now enjoys, Moulton declared that "the courts would stop any abuse of discretion." He said application of the formula in other states has pretty well established what commissioners can and cannot do.

Moulton also urged creation of a post of public defender to protect the public from so-called "rate gouging."

Buys Northwestern L&P

Iowa Electric Light & Power Co has purchased the Northwestern Light & Power Co, Sutherland Dows, president of both companies announced recently. The sale was approved by the board of directors of Iowa Electric and the board of directors and stockholders of Northwestern on June 18. The sale became effective at the close of business June 30. Iowa Electric is buying the physical assets of Northwestern and will assume the bonds and other liabilities of that company.

Co-op Drops Sale Offer as WWP Wins Balloting

A small northeastern Washington state electric utility withdrew its offer to sell after a mail ballot indicated half the customers preferred service from the Washington Water Power Co, which had been excluded from the sale proposal.

The Pend Oreille Electric Cooperative, Inc, which serves approximately 1,000 customers in Pend Oreille and Spokane counties, Wash, and Bonner County, Idaho, said that of 690 replies in a mail ballot, 343 favored the Washington Water Power Co. When they proposed a sale, the cooperative directors ruled out the Washington state utility.

WWP President Kinsey M. Robinson publicly protested the exclusion.

The co-op had offered to sell to Pend Oreille County PUD or the Inland Power & Light Co, Spokane, an REA cooperative.

FINANCIAL BRIEFS

Rockland Light & Power Co is planning to sell $4 million of preferred stock and $10 million of 20-year debentures privately . . . **Athens-Piraeus Electricity Co** has received a loan of 6,628,000 pounds ($18,558,400) from the English Electric Co of London, the Greek Government has announced.

First legal step toward the sale of the municipal plant at Waterville, Ohio, has been taken, with the Council planning to approve such an ordinance shortly. The Council faced with an immediate expenditure of $115,000 and additional $160,000 over the next eight years for plant improvements, decided to sell the plant. Toledo Edison Co has offered to bid at least $150,000 for the system.

Union Light, Heat & Power Co has sold $1 million first mortgage 3½% bonds due 1984 to the John Hancock Mutual Life Insurance Co . . . **Colorado Central Power Co** is planning to sell $1.9 million of 3¾% debentures.

New York State Power Authority has made arrangements with a group of banks, headed by National City Bank and the Bankers Trust Co, to borrow $40 million for one year at 1½% interest, pending permanent financing. Funds will be used to begin building Authority's $315 million hydro plant on St. Lawrence River. Authority plans within the year to sell revenue bonds to cover the construction costs.

Commonwealth Edison Co will distribute to its stockholders in August 656,454 common shares of its subsidiary, Northern Illinois Gas Co.

Sole Bidder for Ohio Plant

Ohio Power Co is the only known bidder for the Bluffton, Ohio, municipal power plant which will be advertised for five weeks and sold. In a referendum, a vote of about two to one was in favor of the sale. Last summer Ohio Power, the only electric utility serving the Bluffton area, offered the city $466,500 for the plant. The sale would be exclusive of the building and grounds used by the municipal plant.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
June 24	**2.90**	**2.96**	**3.19**	**4.03**	**4.14**	**4.52**	**4.72**	**5.04**	**5.45**
June 17	2.89	2.95	3.16	4.03	4.15	4.51	4.75	5.05	5.45
END OF QTR									
2nd 1954	2.90	2.96	3.19	4.03	4.14	4.52	4.72	5.04	5.45
1st 1954	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Alabama Power	12	May	$13,006,282	$12,050,041	$	$
Arkansas-Missouri Power	4	April	340,988	231,148	.67(a)	.52(a)
Arkansas Power & Light	12	May	6,220,835	5,819,145		
Atlantic City Electric	12	May	3,482,808	2,953,738	1.91(b)	1.89(b)
Central Illinois Light	12	May	3,330,369	3,378,251	2.83(c)	3.20(c)
Delaware Power & Light	12	May	4,421,295	3,872,998	1.96(f)	1.90(f)
Georgia Power	12	May	12,991,169	12,109,004		
Houston Lighting & Power	12	May	11,014,922	9,523,507	2.01(g)	1.92(g)
Iowa Southern Utilities	12	May	1,205,049	1,329,137	1.45(h)	1.91(h)
Mississippi Power & Light	12	May	4,093,257	2,991,248		
Northern Indiana Public Service	12	May	9,410,140	8,868,154	2.26(i)	2.43(i)
Utah Power & Light	12	May	4,988,040	4,921,951	2.44(j)	2.67(j)
Wisconsin Public Service, consolidated	12	April	4,384,027	3,950,878	1.41(k)	1.48(k)

Notes—(a) Based on 426,715 shares in 1954 and 379,316 shares in 1953; (b) Based on 1,550,000 shares in 1954 and 1,331,741 shares in 1953; (c) Based on 1,000,000 shares in 1954 and 900,000 shares in 1953; (f) Based on 1,858,389 shares in 1954 and 1,627,640 shares in 1953; (g) Based on 5,281,790 shares in 1954 and 4,753,209 shares in 1953; (h) Based on 741,947 shares in 1954 and 616,685 shares in 1953; (i) Based on 3,487,241 shares in 1954 and 3,119,374 shares in 1953; (j) Based on 2,042,500 shares in 1954 and 1,842,500 shares, in 1953; (k) Based on 2,534,937 shares in 1954 and 2,218,070 shares in 1953.

FINANCIAL

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF JUNE 24–30			
Bonds			
Consumers Power—1st mtg 3% due 1984	$25,000	100%	3.00%
Duquesne Light—1st mtg 3⅛% due 1984	16,000	102.461	3.00
Preferred Stock			
Maine Public Service—40,000 sh 4.75% $50 par cum	$2,000	$50.00	4.75%
Public Service Co of Indiana—600,000 sh 4.16% $25 par cum	15,000	25.00	4.16
Florida Power & Light—50,000 sh 4.32% $100 par cum	5,000	102.00	4.24
Common Stock			
Florida Power & Light—245,000 sh	$11,515	$47.00	3.83%
SCHEDULED FOR JULY—AUGUST			
Bonds			**Bid Date**
Southwestern Public Service—1st mtg due 1979	$20,000		July 8
Missouri Power & Light—1st mtg due 1984	7,500		July 13
Consolidated Gas, Electric Light & Power Co of Baltimore—1st mtg due 1989	40,000		July 19
Boston Edison—1st mtg due 1984	18,000		July 26
Pacific Power & Light—1st mtg due 1984	30,000		Aug. 9
Metropolitan Edison—1st mtg due 1984	3,000		Aug. 15
Arkansas Power & Light—1st mtg due 1984	7,500		Aug. 24
Gulf States Utilities—1st mtg due 1984	24,000		(f)
Consolidated Edison Co of N. Y.—1st mtg due 1984	50,000		(f)
Preferred Stock			
Public Service Co of New Hampshire—75,000 sh $100 par	$7,500		(g)
California Electric Power—105,000 sh $50 par	5,250		(b)
Missouri Public Service—50,000 sh $100 par	5,000		(a)
Central Vermont Public Service—10,000 sh $100 par 4.65%	1,000		(e)
Gulf States Utilities—160,000 sh $100 par	16,000		(f)
Southwestern Public Service—80,000 sh $25 par cum	2,000		
Common Stock			
Long Island Lighting—690,062 sh (to be offered commonholders on 1-for-8 basis, record July 7 to expire July 22; unsubscribed sh to be sold to underwriters; 64,685 sh to be offered to employees)			
UNSCHEDULED, AND/OR UNDER CONSIDERATION			
Bonds			
Indiana & Michigan Electric—1st mtg	$16,500		
Long Island Lighting—1st mtg	20,000		
Kansas City Power & Light—1st mtg	16,000		
Central Hudson Gas & Electric—1st mtg	10,000		
Connecticut Light & Power—1st mtg	10,000		
Central Illinois Electric & Gas—1st mtg	4,000		
New Orleans Public Service—1st mtg	6,000		
Kentucky Utilities—1st mtg	15,000		

Notes—(a) Postponed indefinitely; Kidder, Peabody & Co, underwriters; (b) Temporarily postponed; Merrill, Lynch, Pierce, Fenner & Beane group, underwriters; (e) To be sold privately; (f) Temporarily postponed; and (g) First Boston Corp—Kidder, Peabody & Co, underwriters.

Con Gas Gets Rate Hike . . .

. . . of $3.3 million a year from the Maryland PSC. This is 86% of the $3,850,000 a year requested by the company

The Public Service Commission of Maryland has granted the Consolidated Gas, Electric Light & Power Co of Baltimore a $3.3-million rate increase. This is 86% of the requested $3,850,000 which the company had filed and is equal to 5.33% increase on rates that are now in existence.

The commission's order said, "Consolidated's estimate of additional revenue to be produced by the rates applied for was $6.4 million for the calendar year 1952, which estimate was reduced to $3,850,000 when Consolidated, giving effect to the reduction in charges of Pennsylvania Water & Power Co, lowered the amount of increase sought in electric rates to 6.217%. . . ."

Drastic Increase in Expenses . . . The order continued: "The application gives as the primary reasons for the rate increases drastic increases in federal income taxes, successive wage increases, and higher costs of materials and equipment required for the supply of the services furnished by the utility.

"In explanation of the decision not to seek an increase in the rates for gas service, the application refers to the change brought about by the introduction of natural gas in 1950 and states that the natural gas business is still in a developmental period and gives indication of continued economic growth under the existing rates."

The commission, which under Maryland law, is required to find ". . . a reasonable return on the fair value of its property devoted to public service . . ." said, "The complexity of this problem is at once apparent when we consider that values have been introduced in evidence based upon many theories, such as: (1) Commission value brought to date; (2) original cost to Consolidated; (3) original cost when first dedicated to public use; (4) market value of securities; (5) valuation study costs, and in addition, there is considerable difference among the witnesses as to the proper allowance to be made for depreciation." PSC stated that all rate base figures would be based on the Dec. 31, 1953 date.

The order went on to say, "The value heretofore established by this commission brought down to that date for total company is $277,748,487. People's counsel contends that this figure includes three large factors which inflate the net original costs: Such factors being the historical differential, the amount shown in the acquisition adjustment account, and the inadequacy of the company's book depreciation reserve . . ."

People's counsel claims that the sum of $2,070,000 represents excess valuations placed upon the property of the company by the PSC. The amount recorded in acquisition adjustment account for property is $15,893,662, and it is claimed that inclusion of this amount is improper and that original cost is overstated by that amount. With respect to depreciation reserves it is claimed that an additional $9,567,310 should be added to the depreciation reserve balance, thus decreasing the value of the company's property by that amount. The aggregate of these three elements is $27,530,972 which the People's counsel contends should be deducted from the PSC value in arriving at fair value of the company's property.

Current Appraisal Cost . . . "The current cost appraisal of the physical property of the company, as testified to by D. M. Cook, showed the valuation made by the (Jay Samuel) Hartt organization to be $397,912,975."

The order continued, "We have likewise considered the market value of the company's capitalization, shown by the testimony to be $313,644,000.

"We have also given consideration to the rate base figures submitted by People's counsel, ranging from $233,241,520, representing original cost less retirements, to a book base of $268,340,300."

The commission noted that while it previously allowed cash working capital that in this case "careful study of the testimony in this case indicates that the company has adequate cash working capital which neither it nor its owners were required to advance and that, therefore, in establishing the rate base in this case no allowance should be made for cash working capital."

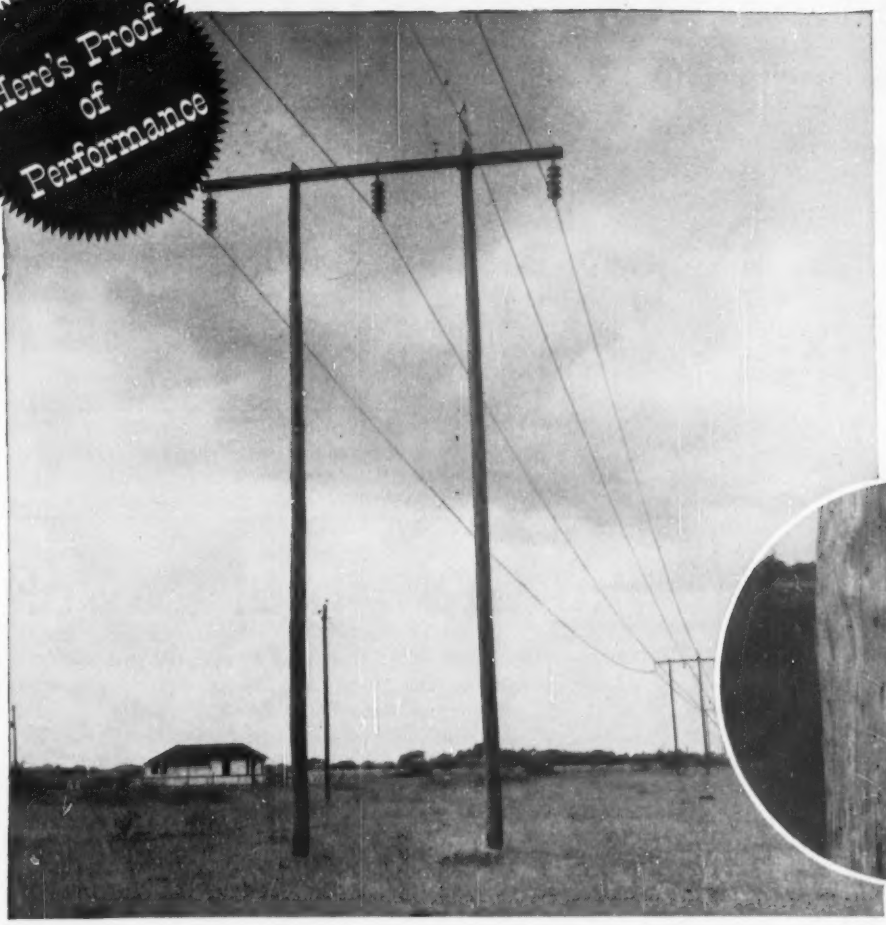
The commission went on to say, "After a consideration of all the elements which go into the determination of the present fair value of the property of the company, the commission has concluded that the fair value of the physical property of the company, exclusive of materials and supplies, used and useful in the interest of the public as of Dec. 31, 1953, is $265 million. Adding to this figure materials and supplies produces a rate base of $276,402,575."

Fair Value . . . It should be noted that the above "fair value" of the property, exclusive of materials and supplies, is some $3 million less than the book cost and nearly $13 million less than the commission's own valuation as of Dec. 31, 1953.

As to the rate of return, the commission stated: "Two witnesses produced by protestants testified; one of these suggested a rate of 5.6%, the other a rate of return of 5.7%. A witness for the company recommended a rate of return of 6.5%. The commission has heretofore established a rate of return of 5½% to 6% as fair. Taking into consideration the cost of debt, the cost of preferred, and the cost of equity capital, as testified to by the witnesses, the commission is of the opinion that the company should be permitted to earn a rate of return of 5.6% to 6%."

The order concluded: "With respect to the increase in electric rates, this commission, in view of (1) the establishment of a year-end rate base to which the rate of return is applied, and (2) the fact that investment in plant subsequent to Jan. 1, 1953, will produce a slight increase in net operating income, finds that an increase of $3.3 million, after allowance of 52% for income taxes, will be sufficient to produce net operating income from the electric segment with the range of 5.6% to 6%."

Here's Proof of Performance



SOME OF THE 28-YEAR-OLD pressure-creosoted poles in the Wallis-Sealy line of Houston Lighting & Power Company, Houston, Tex. The poles carry three phase and one static wire.

A CLOSE-UP of one of the poles showing its excellent condition. They have a future life expectancy of five to ten years.

247 pressure-creosoted poles installed in 1926

...233 STILL IN GOOD CONDITION TODAY

● A combination of warm moist climate and the prevalence of termites makes the use of pressure-creosoted poles a necessity for Houston Lighting & Power Company. It means the difference between five years of life for an untreated pole to 30 to 35 years for a treated one.

A good example of sound pole line planning is found in the 11.8 miles of 66 KV outer loop between the Texas communities of Wallis and Sealy—all pressure-creosoted poles. Here 247 poles were installed in 1926 (actually 260—but 13 were since replaced to obtain greater height). Today, after 28 years of exposure to weather and wood's natural enemies, 233 poles—or over 94% of the original line—remain in good condition, with a future life of 5 to 10 years.

Houston Lighting & Power Company first used pressure-creosoted poles in 1921, and conversion has been complete now for more than 20 years. Southern yellow pine and fir poles are treated with Creosote to 10 pounds retention.

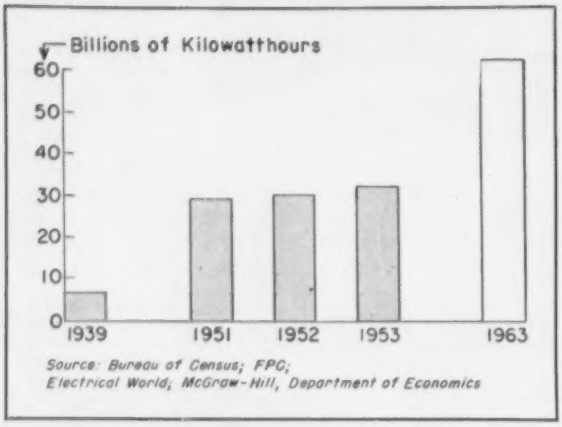
You can count on uniformly good results when your poles are treated with USS Creosote—the product of United States Steel's tar distilling operations. For more information on USS Creosote and the long pole life it assures, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS CREOSOTE USS

4-1466

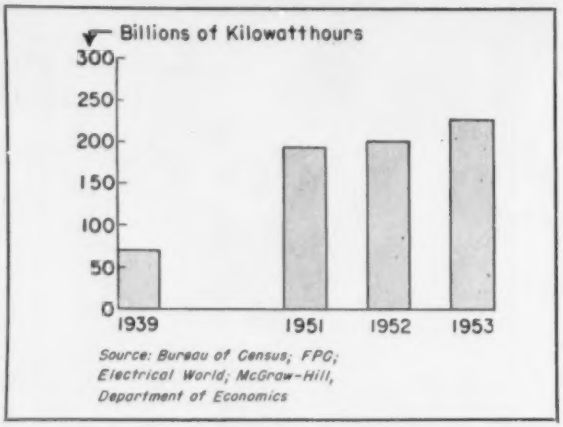
UNITED STATES STEEL

Fast-Growing Chemical Power Use . . .



Source: Bureau of Census; FPC; Electrical World; McGraw-Hill, Department of Economics

Boosts Manufacturing Power Consumption



Source: Bureau of Census; FPC; Electrical World; McGraw-Hill, Department of Economics

Chemicals and the Growth of Power

The business of generating electric power is a "growth" industry, as everyone probably knows. That is, it regularly grows a good deal faster than the rest of the economy. Today, for instance, U. S. power consumption is running about 6% ahead of a year ago, even though total economic activity is down by about 4%.

One of the key reasons for rapid growth in power use is the close tie-in between power generation and other growth industries. It is a fortunate fact that the fastest growing large industries in the U. S. are heavy power consumers. Their growth has contributed heavily to the expansion of electric power use in the U. S.

Light Metals' Load Growing Fast . . . The light metals (EBO, July 6, 1953) are outstanding examples. They used about 8 billion kwhr in 1946, probably more than 23 billion kwhr last year. Within 15-20 years, they will be using as much electricity as all the primary metals—including gigantic steel—do today. Paper and pulp, petroleum and glass are other big, fast-growing power consumers.

The chemical industry is one of the "growth" industries which has contributed heavily to expanding use of electric power. Chemical production expanded about 240% between 1939 and 1953. Chemical consumption of electric power more than tripled in the same period, to an estimated level of more than 32 billion kwhr.

Chemical companies owe their fast growth chiefly to two factors. First, they produce a lot of materials that are basic to operations in other industries—somewhat as electric power is basic to many industries. These products provide a firm base for growth as the rest of industry expands. Among them are sulfuric acid, nitrogen, chlorine, ammonia and other standard products.

In addition, the chemical industries are among the prize innovators in the modern world. They constantly come up with new products and processes that open up new markets—frequently huge ones. And many of these new products are heavy users of electric power. Just a few of the relatively new products: plastics, synthetic fibers like nylon and dacron, petrochemicals.

The growth rate for some of these products approaches the fantastic. Production of synthetic resins for plastics grew more than 1,000%—**per capita**—between 1939 and 1953. Synthetic fibers (which don't include rayon) expanded by more than 100% between 1950 and 1953.

Even those "basic" products like sulfuric acid have outdistanced growth in most of the rest of the economy. On a per capita basis, consumption of sulfuric acid grew 125% between 1939 and 1953. Ammonia consumption grew 500%, chlorine 373%. For comparison: total industrial production, per capita, grew by about 78%.

Chemical Industry Will Continue to Grow . . . There's every reason to believe that the chemical industry will continue to grow more rapidly than the general economy in the future. Basic products, like sulfuric and nitric acid, will continue to find new uses in both the chemical and other industries. Relatively new products have great growth potentials. It's been estimated that production of petrochemicals—chemicals from oil—may quadruple in the next ten years. Plastic use may double in the next 15 years or less.

The chances are that growth in the chemcial industry won't be as rapid in the next ten years as in the last ten. Expansion in the 40's and early 50's was speeded by two wars. In addition, any growth starting now takes off from an already very high level of activity, which makes new gains harder to make than they were in the early 40's. But even a modest estimate of growth in the chemical industry can have a pretty impressive effect on an estimated electric power consumption.

FEWER SPLICES need be made when you run "all purpose" Durasheath. It can be run buried, overhead, in ducts . . . in one continuous run.

New trend in industrial wiring: Neoprene jacketed cable

Users find this tough, long-lasting "premium" cable actually costs little more to use . . . then cuts upkeep.

A chemical plant in Texas uses ANACONDA Durasheath* neoprene jacketed cable *as building wire* for power and lighting. A plant in St. Louis does, too. Another in Chicago.

The practice of using versatile Durasheath for building wire has caught on from coast to coast. And there's good reason.

This cable costs little more to use than the cheapest cable you can buy—and more than makes up this difference in long trouble-free service, lower maintenance costs!

Durasheath's tough jacket is made of specially compounded neoprene. It shrugs off heat, moisture, corrosive fumes. And it takes rough handling in stride. As demand for electricity rises, Durasheath provides added reliability.

Industry engineers call Durasheath "good insurance." And it is!

Durasheath comes in all sizes, single and multiple conductor, copper and aluminum from 600 to 15,000 volts. You can run it in the ground, overhead, in damp ducts in *one continuous run* with minimum splicing. Want more information? See your Anaconda Representative or write *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off. 54367

Durasheath neoprene jacketed cable

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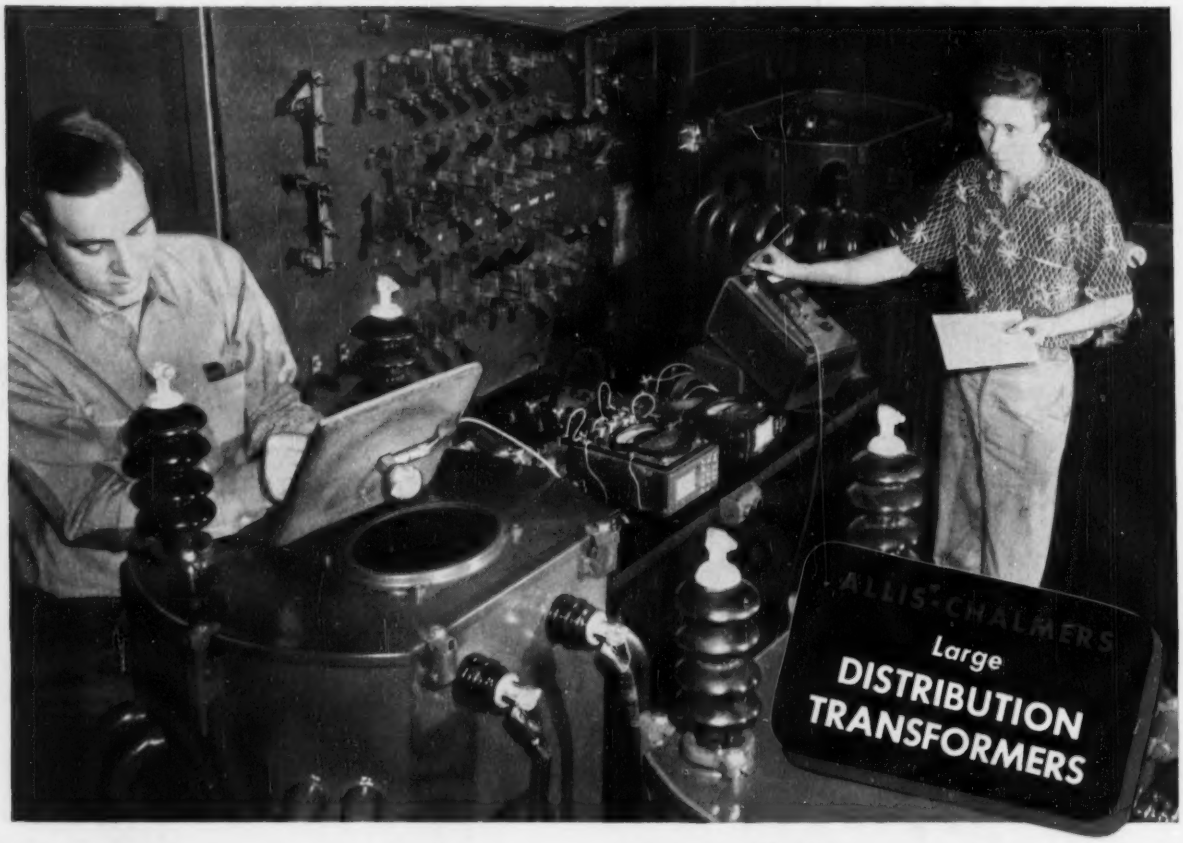


Sound Levels Checked

by PRODUCTION LINE sound level testing

As distribution systems grow, distribution transformers in residential areas are getting larger. It's more important than ever to keep noise levels low.

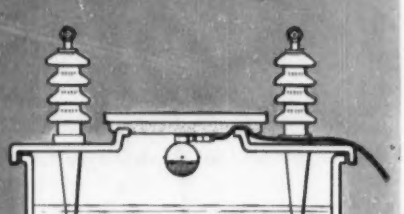
Since 1951, Allis-Chalmers has been conducting *production line* noise level checks on large distribution transformers. As a result, Allis-Chalmers has consistently delivered uniformly quiet transformers.

Sound level research, too — In cooperation with sound experts, Allis-Chalmers engineers are conducting research in magnetostriction in electrical core steels and resonance in core structures of all sizes and ratings. They are testing the effects of clamping pressures and anchoring of core and coil assemblies. Allis-Chalmers operates a separate, specially designed sound laboratory with extensive equipment for sound level research.

The result is a complete line of transformers that helps utilities build good will. If you would like more information on this or any other Allis-Chalmers transformer development, contact the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wis.

A-4366

How It's Done



Here's how noise checks are made under normally noisy manufacturing conditions: The air space in the transformer tank above the oil becomes a miniature sound room. A microphone is suspended into this space and it is sealed from external noises. The microphone picks up noise when the transformer is energized. Noise level value is recorded and checked against established values.

ALLIS-CHALMERS